June 1993

ORGS UKMO U

National Meteorological Library
FitzRoy Road, Exeter, Devon. EX1 3PB

Duplicate not available.

METEOROLOGICAL OFFICE
LIBRARY

UK METEOROLOGICAL OFFICE GLOBAL DATA MONITORING REPORT

JUNE 1993

Central Forecasting Division
Meteorological Office
London Rd
Bracknell
Berkshire
RG12 2SZ

This report has not been published. Permission to quote from it should be obtained from the Assistant Director of the above Meteorological Office Division

Distribution List

Mr J Brown	NMC, Victoria, Australia
Dr H W Christ	Deutscher Wetterdienst, Offenbach, Germany
Dr.P Julian	NMC, Washington, USA
Mr E A Meindl	National Data Buoy Centre, Stennis Space Center, USA
Permanent Rep. with WMO	Moscow, CIS
Mr Nobuo Sato	JMA, Tokyo, Japan
Dr.B Strauss	ECMWF, Reading, UK
Dr.M J Uddstron	Met. Service, Wellington, New Zealand
Mr J R Leighton	Met. Office, Bracknell, UK
Mr R W Lunnon	Met. Office, Bracknell, UK
Mr A Radford	Met. Office, Bracknell, UK
National Meteorological Library	Met. Office, Bracknell, UK

CONTENTS

1. Introduction

2. Global Data Monitoring Statistics

...oooOOOooo...

1. Introduction

As the WMO-appointed lead centre for monitoring surface marine data, the U.K. Meteorological Office produces monthly statistics on the quality of these observations received at RSMC Bracknell. This report includes this information along with statistics for most other types of data. The figures and tables contained herein are presented according to the agreed standards for the exchange of monitoring results.

The report is based on data received at the UK Meteorological Office Headquarters, Bracknell in time for inclusion into the appropriate analysis. The evaluation of data quality is based on comparison with the appropriate 6-hour global model forecast (background field). Generally, the background field is of high quality except in data sparse areas, tropical regions and areas close to steep orography where care should be taken in interpreting the statistics shown.

Comments or queries on the report are welcome and should be addressed to:-

Mr A Radford
Observation Processing Manager
Central Forecasting Division
Meteorological Office
London Road
Bracknell
Berkshire
United Kingdom
RG12 2SZ

2 Global Data Monitoring Statistics

Ships, Fixed buoys, Platforms and Drifting buoys observations

TABLES 1-2 contain lists of the stations which are considered to have returned suspect observations of pressure, windspeed, wind direction or temperature, as appropriate, during the month. The criteria for quality control are given on the header page for each table.

Figures 1 and 2 show 10 degree lat/long box average numbers of SHIP/SYNOP and DRIBU observations received per day thoughout the month at Bracknell and assimilated into model runs. Only data from the main hours of 00 UTC, 06 UTC, 12 UTC and 18 UTC are included. Box average values are plotted as the nearest whole number (values of x.5 are rounded up). Where the average is more than 999, then 999 is plotted. A box with no observations is blank. If the 24 hour average >0 but <0.5, then 0 is plotted.

Aircraft observations

TABLE 3 contains a list of statistics calculated from data received from all airline carriers.

Figure 3 shows 10 degree lat/long box average numbers of AIREP/ASDAR reports received per day throughout the month at Bracknell and assimilated into model runs in the layer 70-500 hPa. Observations with a vector wind difference (compared with the model background field) of >60 m s^{-1} have been excluded. Box average values are plotted as the nearest whole number (values of x.5 are rounded up). Where the average is more than 999, then 999 is plotted. A box with no observations is blank. If the 24 hour average >0 but <0.5, then 0 is plotted.

Figures 4-7 show wind statistics for AIREP/ASDAR in the layer 70-500 hPa. Observations with a vector wind difference > 60 m s^{-1} have been excluded. Statistics have not been calculated for 10 degree lat/long boxes containing <31 observations.

Figure	Parameter
4	Mean wind vectors
5	Mean observation - background wind vector
6	Mean observation-background speed (m s^{-1})
7	RMS observation-background vector (m s^{-1})

Satellite Observations

Figures 8-22 show satellite wind statistics for all geostationary satellites. All plots other than **AVAILABILITY** show average data where there are > 10 observations in a 10 degree lat/long box.

Figure	Parameter Plotted	Layer (hPa)
8	Availability/average daily number	701-1000
9	Vector mean wind (observed)	701-1000
10	Observation-background vector wind difference	701-1000
11	Mean observation-background speed differences	701-1000
12	RMS observation-background vector difference	701-1000
13	Availability/average daily number	401-700
14	Vector mean wind (observed)	401-700
15	Observation-background vector wind difference	401-700
16	Mean observation-background speed differences	401-700
17	RMS observation-background vector difference	401-700
18	Availability/average daily number	101-400
19	Vector mean wind (observed)	101-400
20	Observation-background vector wind difference	101-400
21	Mean observation-background speed differences	101-400
22	RMS observation-background vector difference	101-400

Figures 23-25 show satellite mean observation-background temperature differences for NOAA-11 soundings at 500 km resolution and figures 26-28 show the same statistics for NOAA-12. Data are plotted where there are > 30 observations in a 10 degree lat/long box.

Figure	Layer (hPa)
23/26	850-1000
24/27	100-300
25/28	30-50

TABLE 1

MONITORING OF MARINE SURFACE OBSERVATIONS
MONTHLY SUSPECT LIST - SHIPS, FIXED BUOYS AND PLATFORMS
MONITORING CENTRE: BRACKNELL
MONTH: JUNE 1993

Monitoring procedures

Period		:One calendar month.
Data monitored		:Reports from each unique identifier for ships, fixed buoys and platforms.
Standard of comparison		:Background field from Bracknell global model.
Observation times		:00, 06, 12, 18 UTC
Elements monitored		:Mean sea level pressure (hPa). :Wind speed (m s^{-1}). :Wind direction (Degrees).
Parameters monitored	:NOBS	:Number of observations received excluding duplicates.
	:NGE	:Number of observations with gross errors.
	:PGE	:Percentage of observations with gross errors.
	:SD	:SD of difference of observations from background values excluding those with gross errors.
	:BIAS	:Mean difference of observations from background values excluding those with gross errors. **N.B. a positive bias indicates the observation is veered to the background.**
	:RMS	:Root Mean Square difference of observations from background values excluding those with gross errors.
GROSS ERROR LIMIT	:15 hPa (pressure) :25 m s^{-1} (vector wind)	
SELECTION CRITERIA	:NOBS	$\geq$ 20 , and one or more of the following:
	1. |bias|	$\geq$ 4 hPa (pressure), $\geq$ 5 m s^{-1} (wind speed) $\geq$ 30 degrees (direction).
	2. SD	$\geq$ 6 hPa (pressure) $\geq$ 80 degrees (direction).
	3. PGE	$\geq$ 25.

IDENTIFIER	HOUR	ELEM	LEVEL	NOBS	NGE	PGE	SD	BIAS	RMS
MEAN SEA-LEVEL PRESSURE									
CG3126	ALL	MSLP	SUR	34	0	0	1.7	-4.3	4.6
C6KQ9	ALL	MSLP	SUR	38	0	0	1.2	5.1	5.2
ELFN7	ALL	MSLP	SUR	26	0	0	1.0	4.2	4.3
ELGI2	ALL	MSLP	SUR	32	0	0	1.8	5.1	5.4
ESBI	ALL	MSLP	SUR	24	0	0	1.1	7.0	7.1
ESDO	ALL	MSLP	SUR	25	1	4	1.8	7.8	8.0
EWWV	ALL	MSLP	SUR	26	1	4	1.6	-4.0	4.4
LAJI4	ALL	MSLP	SUR	38	0	0	2.0	8.1	8.4
NIKL	ALL	MSLP	SUR	28	15	54	3.2	-1.0	3.4
UFAA	ALL	MSLP	SUR	76	0	0	1.1	5.2	5.4
UFKA	ALL	MSLP	SUR	23	0	0	1.5	-6.9	7.0
UHLW	ALL	MSLP	SUR	23	0	0	1.0	-11.5	11.6
UHUN	ALL	MSLP	SUR	25	0	0	1.3	5.2	5.3
UJEH	ALL	MSLP	SUR	21	0	0	5.8	6.4	8.6
ULDZ	ALL	MSLP	SUR	27	0	0	1.6	7.8	8.0
UNWZ	ALL	MSLP	SUR	31	2	6	6.0	-2.5	6.5
URFB	ALL	MSLP	SUR	31	1	3	0.9	-4.0	4.1
UUJV	ALL	MSLP	SUR	58	0	0	2.1	-6.9	7.2
UWVZ	ALL	MSLP	SUR	50	0	0	2.5	4.4	5.0
UYHW	ALL	MSLP	SUR	22	1	5	2.1	5.8	6.1
WE3806	ALL	MSLP	SUR	46	0	0	1.3	-4.1	4.3
WQZ9670	ALL	MSLP	SUR	43	0	0	2.3	4.4	5.0
ZCAM9	ALL	MSLP	SUR	44	1	2	2.2	5.1	5.6
3EIM3	ALL	MSLP	SUR	28	0	0	0.9	-4.4	4.4
9HDV3	ALL	MSLP	SUR	26	0	0	2.1	4.6	5.1
WIND SPEED									
BROE	ALL	SPEED	SUR	32	22	69	6.5	13.7	15.1
DPEW	ALL	SPEED	SUR	20	0	0	2.9	5.4	6.1
DQFU	ALL	SPEED	SUR	34	3	9	4.2	5.0	6.5
FNPA	ALL	SPEED	SUR	21	0	0	5.8	6.1	8.4
GOSP	ALL	SPEED	SUR	20	0	0	4.6	5.2	7.0
MNKN2	ALL	SPEED	SUR	42	0	0	5.2	6.6	8.4
VJBE	ALL	SPEED	SUR	27	0	0	5.0	6.5	8.2
VPGM	ALL	SPEED	SUR	32	0	0	3.6	5.3	6.4
XYKM	ALL	SPEED	SUR	21	0	0	4.0	6.0	7.3
3EIM3	ALL	SPEED	SUR	29	0	0	2.2	5.0	5.5
9MSI	ALL	SPEED	SUR	22	0	0	6.5	6.0	8.8
WIND DIRECTION									
CG2614	ALL	DIRN.	SUR	31	0	0	34.5	33.6	48.2
ELIO8	ALL	DIRN.	SUR	29	0	0	58.2	32.4	66.6
ZCKP	ALL	DIRN.	SUR	21	0	0	107.5	27.2	110.9
22001	ALL	DIRN.	SUR	82	0	0	14.3	45.3	47.5
3ELF9	ALL	DIRN.	SUR	22	0	0	71.5	64.6	96.4

FIGURE 1

AVAILABILITY - SHIP/SYNOP - JUNE 1993
MAIN HOURS ONLY
10 DEGREE BOX AVERAGE NUMBER OF OBSERVATIONS IN 24 HOURS
TOTAL AVERAGE NUMBER OF OBSERVATIONS IN 24 HOURS = 19613

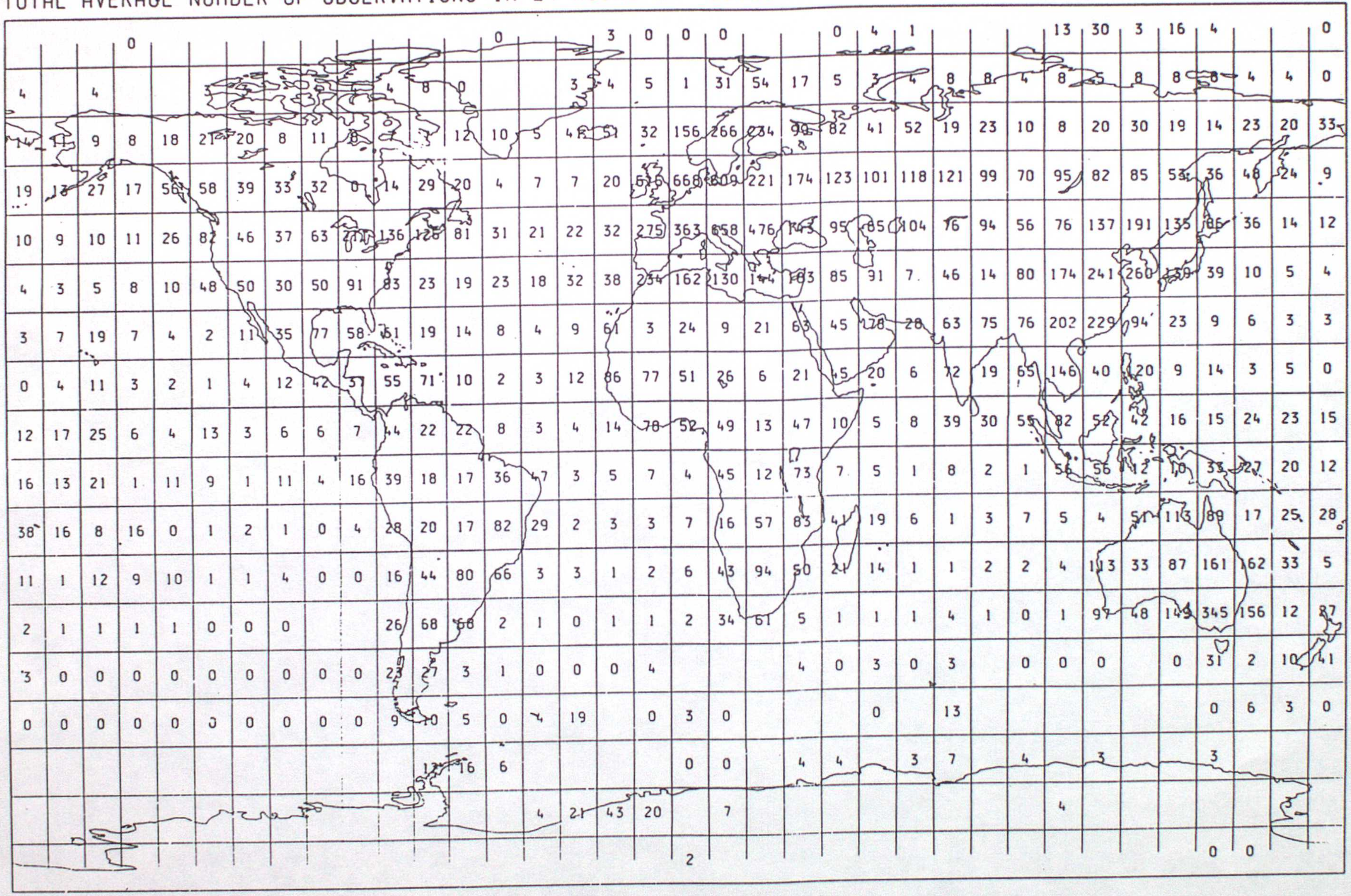

0 0 3 0 0 0 0 4 1 13 30 3 16 4 0
4 4 3 4 8 0 3 4 5 1 31 54 17 5 3 4 8 8 4 8 5 8 8 8 4 4 0
14 11 9 8 18 21 20 8 11 8 7 3 12 10 5 41 51 32 156 266 234 96 82 41 52 19 23 10 8 20 30 19 14 23 20 33
19 13 27 17 56 58 39 33 32 0 14 29 20 4 7 7 20 616 666 609 221 174 123 101 118 121 99 70 95 82 85 53 36 48 24 9
10 9 10 11 26 82 46 37 63 271 136 126 81 31 21 22 32 275 363 658 476 143 95 85 104 76 94 56 76 137 191 135 86 36 14 12
4 3 5 8 10 48 50 30 50 91 83 23 19 23 18 32 38 234 162 130 144 163 85 31 7 46 14 80 174 241 260 139 39 10 5 4
3 7 19 7 4 2 11 35 77 58 61 19 14 8 4 9 61 3 24 9 21 63 45 178 28 63 75 76 202 229 94 23 9 6 3 3
0 4 11 3 2 1 4 12 42 37 55 71 10 2 3 12 86 77 51 26 6 21 45 20 6 72 19 65 146 40 120 9 14 3 5 0
12 17 25 6 4 13 3 6 6 7 44 22 22 8 3 4 14 78 52 49 13 47 10 5 8 39 30 55 82 52 42 16 15 24 23 15
16 13 21 1 11 9 1 11 4 16 39 18 17 36 47 3 5 7 4 45 12 73 7 5 1 8 2 1 56 56 12 10 33 27 20 12
38 16 8 16 0 1 2 1 0 4 28 20 17 82 29 2 3 3 7 16 57 83 41 19 6 1 3 7 5 4 51 113 89 17 25 28
11 1 12 9 10 1 1 4 0 0 16 44 80 66 3 3 1 2 6 43 94 50 21 14 1 1 2 2 4 113 33 87 161 162 33 5
2 1 1 1 1 0 0 0 26 68 68 2 1 0 1 1 2 34 61 5 1 1 1 4 1 0 1 97 48 149 345 156 12 87
3 0 0 0 0 0 0 0 0 0 23 27 3 1 0 0 0 4 4 0 3 0 3 0 0 0 0 31 2 10 41
0 0 0 0 0 0 0 0 0 0 9 10 5 0 4 19 0 3 0 0 13 0 6 3 0
13 16 6 0 0 4 4 3 7 4 3 3
4 21 43 20 7 4 3
2 0 0

TABLE 2

MONITORING OF MARINE SURFACE OBSERVATIONS
MONTHLY SUSPECT LIST - DRIFTING BUOYS
MONITORING CENTRE: BRACKNELL
MONTH:JUNE 1993

Monitoring procedures

Period		:One calendar month.
Data monitored		:Reports from each unique identifier for drifting buoys.
Standard of comparison		:Background field from Bracknell global model.
Position		:Average Latitude and Longitude for period.
Observation times		:00, 06, 12, 18 UTC
Elements monitored		:Mean sea level pressure (hPa) :Wind speed (m s^{-1}), :Wind direction (degrees).
Parameters monitored	:NOBS	:Number of observations received excluding duplicates.
	:NGE	:Number of observations with gross errors.
	:PGE	:Percentage of observations with gross errors.
	:SD	:SD of difference of observations from background values excluding those with gross errors.
	:BIAS	:Mean difference of observations from background values excluding those with gross errors. **N.B. a positive bias indicates the observation is veered to the background.**
	:RMS	:Root Mean Square difference of observations from background values excluding those with gross errors.
GROSS ERROR LIMIT	:15 hPa (pressure) :25 m s^{-1} (vector wind)	
SELECTION CRITERIA	:NOBS	≥ 20 ,and one or more of the following:

1. |bias|	≥ 4 hPa	(pressure).
	≥ 5 m s^{-1}	(wind speed).
	≥ 30 degrees	(direction).
2. SD	≥ 6 hPa	(pressure).
	≥ 80 degrees	(direction).
3. PGE	≥ 25.	

IDENTIFIER	LAT.	LONG.	HOUR	ELEM	LEVEL	NOBS	NGE	PGE	SD	BIAS	RMS
MEAN SEA-LEVEL PRESSURE											
71003	-79.0	-28.0	ALL	MSLP	SUR	549	549	100	0.0	0.0	0.0
74002	-72.1	-2.5	ALL	MSLP	SUR	470	170	36	2.4	-10.9	11.2
WIND DIRECTION											
42027	28.4	-92.0	ALL	DIRN.	SUR	79	0	0	110.1	8.9	110.5
52001	2.0	163.0	ALL	DIRN.	SUR	25	0	0	99.7	1.7	99.7
52003	4.8	165.5	ALL	DIRN.	SUR	24	0	0	72.6	-33.8	80.0
52012	-1.9	156.0	ALL	DIRN.	SUR	41	0	0	74.4	34.2	81.9
52310	1.9	-179.7	ALL	DIRN.	SUR	30	0	0	59.4	-31.3	67.2
55589	-25.4	160.1	ALL	DIRN.	SUR	156	0	0	34.6	-52.2	62.6

FIGURE 2

AVAILABILITY - DRIBU - JUNE 1993
MAIN HOURS ONLY
10 DEGREE BOX AVERAGE NUMBER OF OBSERVATIONS IN 24 HOURS
TOTAL AVERAGE NUMBER OF OBSERVATIONS IN 24 HOURS = 2768

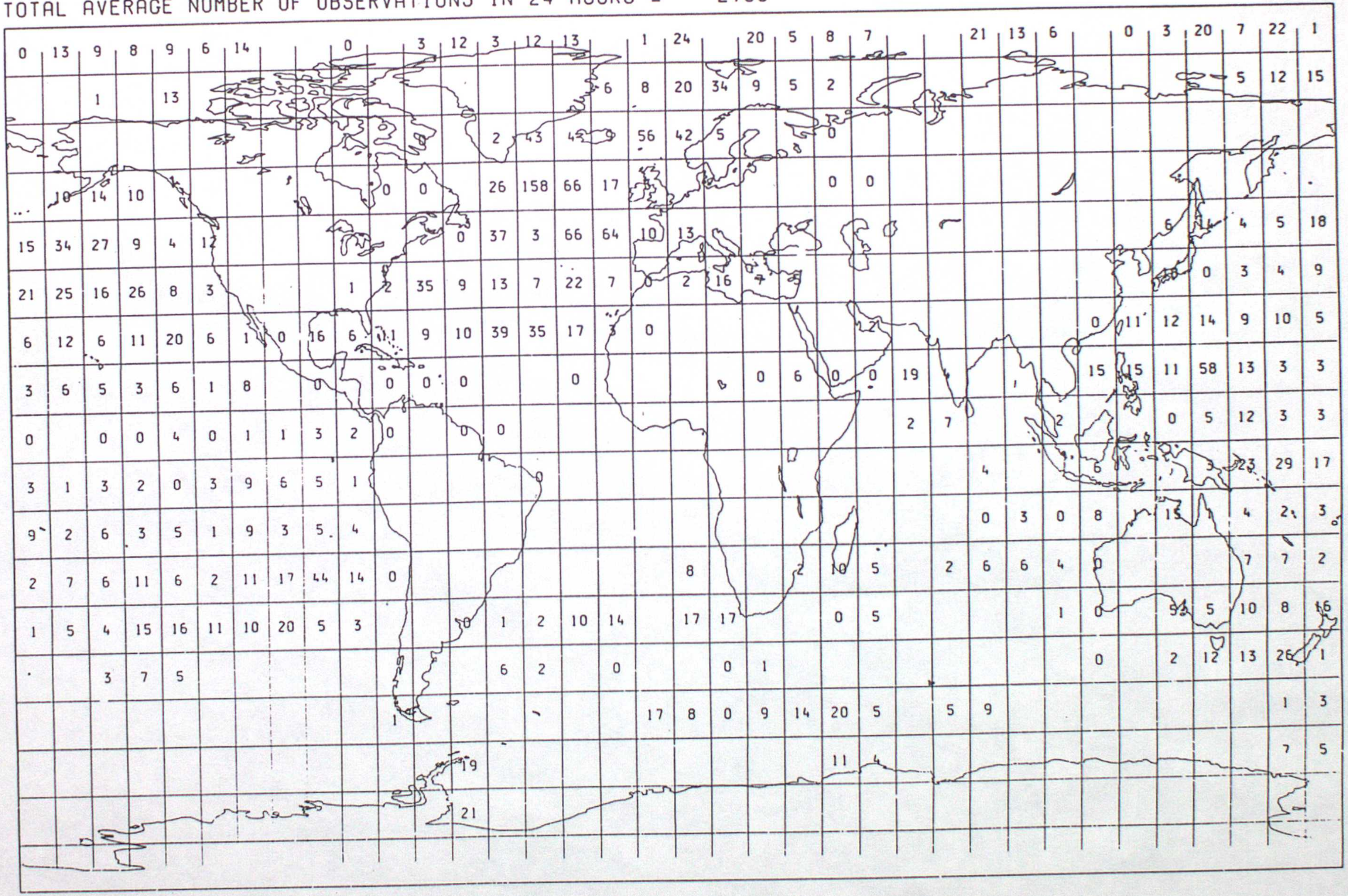


TABLE 3

MONTHLY MONITORING OF AIRCRAFT OBSERVATIONS
MONITORING CENTRE: BRACKNELL
MONTH:JUNE 1993

Monitoring procedures:
Period :One calendar month.
Data monitored :Statistics for each airline carrier.
Area monitored :90°N - 90°S, 180°W - 180°E.
Standard of comparison :Background field from Bracknell global model.

Observation times :All hours combined.

Level(s) monitored :70.0 - 500.0 hPa

Elements monitored :TEMP in °C ; WIND in m s^{-1}

Parameters monitored
- :N REP. :Number of observations received excluding duplicates.
- :PG :Percentage of observations with gross errors.
- :PR :Percentage of observations rejected by quality control.
- :PC :Percentage of observations with calm winds.
- :RMS :Root Mean Square difference of observations from background values excluding those with gross errors in Temperature & vector wind.
- :BIAS :Mean difference of observations from background values excluding those with gross errors in Temperature & Wind Speed.

GROSS ERROR LIMITS :10.0 °C ; 60 m s^{-1} Vector Wind

SELECTION CRITERIA :N REP $\geq$ 20

		TEMPERATURE				WIND					
IDENT.	N.REP.	PG	PR	RMS	BIAS	N.REP.	PG	PR	PC	RMS	BIAS
AAH	62	0	37	3.9	-1.2	63	0	24	0	6.2	0.1
AAL	3935	1	12	1.7	0.1	3881	0	13	1	7.9	1.5
AAN	157	1	3	2.0	-0.3	147	0	3	0	10.1	1.6
AAR	954	1	14	2.0	-0.7	948	0	14	0	8.5	2.2
AAU	21	5	5	1.3	-0.4	21	0	0	0	8.3	2.1
ACA	952	1	1	2.1	0.0	974	0	1	0	6.5	0.8
ACI	74	1	4	1.5	0.2	74	0	3	0	9.9	1.1
ACU	29	3	3	2.6	-0.6	29	0	0	0	10.9	2.9
AEA	235	1	5	1.9	-0.1	233	0	6	0	11.0	2.1
AEL	279	0	4	2.4	0.9	279	0	5	0	8.6	1.4
AFL	145	3	17	4.4	2.3	138	1	14	3	14.2	1.5
AFR	785	1	5	1.7	0.1	787	0	6	1	8.5	1.8
AMM	20	0	0	1.4	0.6	20	0	5	0	9.7	-0.4
AMT	301	1	22	2.4	-0.4	336	0	20	0	7.4	1.3
AMX	393	1	5	1.7	0.1	393	0	5	0	9.2	2.0
ANA	794	1	12	2.1	0.0	792	0	13	0	9.0	2.1
ANE	55	0	45	0.7	0.3	53	0	45	0	5.2	0.9
ANZ	3162	1	9	1.8	0.0	3151	0	9	1	7.9	1.4
AOM	539	1	4	1.6	0.4	541	0	5	0	7.7	1.4
APW	33	6	15	3.8	0.2	33	0	18	0	16.6	7.0
ARG	160	1	4	2.4	0.4	156	1	3	0	10.0	1.1
ARP	464	1	13	1.7	0.2	456	0	14	2	7.2	1.3
ARU	24	0	0	1.2	0.7	25	0	8	0	11.7	-0.2
ASY	81	0	14	1.4	-0.1	81	0	14	0	6.9	2.8
AUA	91	4	4	2.6	-1.4	94	1	4	0	8.4	2.0
AVA	391	0	2	1.9	-0.4	394	0	4	0	9.2	1.1
AVN	30	0	0	1.0	0.3	30	0	0	0	6.9	1.8
AZA	503	1	4	2.1	0.5	500	0	3	0	8.5	1.9
BAL	176	1	24	2.1	-0.4	172	0	25	0	9.6	3.1
BAW	939	1	5	2.1	-0.1	936	0	6	1	7.6	1.9
BBB	30	7	0	0.9	-0.4	29	0	0	0	5.6	-0.3
BWA	516	1	3	1.6	0.9	517	0	4	1	8.6	1.9
CAL	1708	1	14	1.9	-0.2	1700	0	15	0	9.0	2.0
CCA	368	2	16	2.6	-0.1	364	0	19	0	11.6	1.7
CDN	2332	0	12	2.0	0.3	2316	0	14	2	8.1	1.7
CES	313	1	22	2.0	0.5	312	0	20	0	10.2	0.7
CFC	46	0	22	3.2	0.7	47	0	26	4	7.8	1.7
CFG	580	0	3	1.9	-0.8	577	0	4	0	9.0	1.5
CKS	177	3	19	1.3	0.2	176	0	19	1	7.7	1.5
CKT	40	0	3	2.6	0.5	41	0	5	2	8.4	1.8
CMI	1942	1	16	2.3	0.3	1917	0	16	1	7.4	1.4
CMM	212	0	5	1.8	0.3	219	0	6	0	7.9	1.5
CNB	45	4	7	3.3	2.3	46	0	7	0	11.7	2.1
COA	2617	0	15	1.6	0.4	2549	0	17	1	7.2	1.2
CPA	510	2	5	1.9	0.0	497	0	4	1	7.6	1.3
CRL	156	1	5	1.6	0.0	157	0	6	1	7.7	1.3
CTM	238	1	32	2.8	-1.3	237	0	31	0	8.6	2.8
CUB	139	1	6	2.8	1.4	142	0	7	0	10.5	0.9
CWC	20	0	0	2.2	1.6	20	0	5	0	11.5	3.3
CXN	21	0	24	2.9	1.1	21	0	24	0	7.0	0.6
DAE	40	0	0	2.7	-1.1	38	0	5	0	9.6	1.9
DAL	6203	0	15	1.9	0.6	5924	0	16	0	7.9	1.7
DHL	140	0	3	2.1	0.8	143	0	6	0	11.7	1.5
DLH	3818	1	5	2.1	-0.4	3770	0	11	5	7.9	1.7
DOA	93	0	9	1.5	-0.5	95	0	9	0	8.5	0.5
EIA	165	1	10	2.6	1.5	169	0	15	0	11.9	3.2
ELY	134	1	1	2.1	0.2	137	0	2	0	8.1	1.8
EVA	676	0	13	2.0	-0.9	679	0	14	0	9.8	1.5
FDX	1236	0	9	2.1	0.7	1241	0	10	1	8.6	1.7

		TEMPERATURE				WIND					
IDENT.	N.REP.	PG	PR	RMS	BIAS	N.REP.	PG	PR	PC	RMS	BIAS
FIN	594	1	3	2.1	0.3	586	0	6	2	7.6	1.7
FJI	394	1	3	1.3	0.3	395	0	3	1	9.0	1.5
FMN	31	0	0	1.1	-0.1	31	0	3	0	8.7	2.4
GAF	113	0	2	1.9	0.5	113	0	3	0	9.1	1.4
GIA	351	0	4	1.7	0.3	342	0	5	0	7.2	1.4
HAL	1568	0	23	1.7	0.6	1544	0	24	1	8.6	1.6
HLF	165	0	2	1.7	-0.9	163	0	4	0	7.0	0.5
IBE	2570	1	17	1.9	0.2	2561	0	18	0	8.8	1.0
ICE	413	0	2	2.0	-0.2	404	0	2	1	6.9	1.5
ICX	44	0	0	2.2	-1.0	44	0	2	0	7.6	1.0
JAA	69	3	9	2.1	1.0	69	0	4	1	7.1	0.4
JAL	6135	0	14	1.8	0.4	6097	0	14	1	8.7	1.4
JAS	113	0	9	1.3	0.6	111	0	10	0	7.1	0.6
JAZ	146	0	27	1.6	1.0	145	0	28	0	7.4	0.5
KAL	3818	1	12	1.9	0.0	3798	0	12	0	9.1	1.8
KIW	21	0	33	3.1	2.6	21	0	33	0	7.9	2.8
KLM	1812	0	1	1.9	0.1	1806	0	2	0	8.1	1.5
LAN	81	1	6	2.2	-0.2	81	0	7	0	10.8	1.8
LAP	34	0	15	2.9	-0.8	33	0	27	0	24.3	9.1
LCO	48	2	4	3.0	0.8	48	0	17	0	16.2	2.0
LDA	215	0	15	2.3	-1.6	212	0	17	0	8.7	1.8
LIB	48	0	2	1.4	-0.9	47	0	4	0	6.7	0.7
LLB	46	4	4	2.2	1.1	46	0	7	0	11.4	2.6
LOT	542	1	1	2.0	-0.1	535	0	1	0	7.4	1.8
LTU	536	0	5	1.9	0.5	520	0	6	0	7.9	1.4
MAH	80	0	8	2.7	-0.6	78	0	9	1	8.4	0.8
MAS	373	1	13	2.0	0.5	373	0	14	1	8.8	2.3
MDA	109	2	13	2.4	1.6	109	1	16	1	9.9	2.6
MPH	360	1	2	1.9	-0.2	360	0	4	1	8.2	2.1
MTQ	177	2	20	2.0	0.8	179	0	22	0	9.1	1.2
NCA	852	0	11	2.0	0.2	848	0	13	2	9.0	1.9
NGA	161	1	1	2.0	0.9	160	0	4	0	13.3	1.9
NWA	12564	1	11	2.3	0.2	12475	0	10	1	8.6	1.6
PAL	1181	1	17	1.7	-0.4	1126	0	18	2	7.1	1.3
PAO	613	0	11	1.6	0.0	617	0	13	0	9.1	0.8
QFA	2865	1	8	1.8	0.3	2823	0	10	1	8.4	1.3
RAF	237	0	8	2.5	0.3	232	1	6	0	9.8	1.9
RKA	65	0	0	1.2	0.6	66	0	3	0	9.0	3.2
RON	62	3	8	2.2	0.8	59	0	5	2	6.6	1.0
RRR	200	1	20	2.4	-0.2	200	0	20	2	8.2	1.7
SAA	205	0	3	1.7	-0.7	205	0	3	0	7.8	1.7
SAS	2252	0	1	2.0	-0.2	2226	0	3	2	6.8	1.1
SAW	65	2	5	2.2	1.2	62	0	5	0	9.7	3.2
SIA	1500	1	11	1.8	-0.1	1494	0	13	1	8.8	1.9
SJM	26	0	27	2.3	0.0	26	0	31	4	10.1	1.6
SMB	21	0	0	2.4	0.0	21	0	0	0	7.4	1.8
SOL	70	1	3	1.5	-0.1	68	0	0	0	6.1	1.4
SPP	272	0	1	1.7	-0.4	266	0	3	0	9.1	1.7
SVA	103	0	12	2.5	-0.8	109	0	4	1	8.5	1.2
SWR	313	1	8	2.1	0.1	299	0	10	0	9.9	1.2
TAP	763	2	5	2.2	-0.3	761	0	6	0	9.4	1.7
TBA	93	3	6	2.7	0.8	90	0	2	2	9.1	3.3
TEJ	62	5	18	1.6	-0.4	64	0	17	0	9.7	0.3
THA	418	1	12	1.9	0.1	417	0	14	1	9.3	1.7
TOW	106	1	3	1.9	0.3	106	0	3	0	7.6	2.3
TRH	53	15	15	1.3	0.5	44	0	23	0	5.7	0.2
TSC	44	2	14	1.8	-0.9	42	0	12	0	10.2	3.6
TWA	1001	0	5	2.1	0.4	994	0	5	1	8.1	1.5
UAL	71627	2	4	1.6	-0.2	71597	0	4	0	7.4	1.0

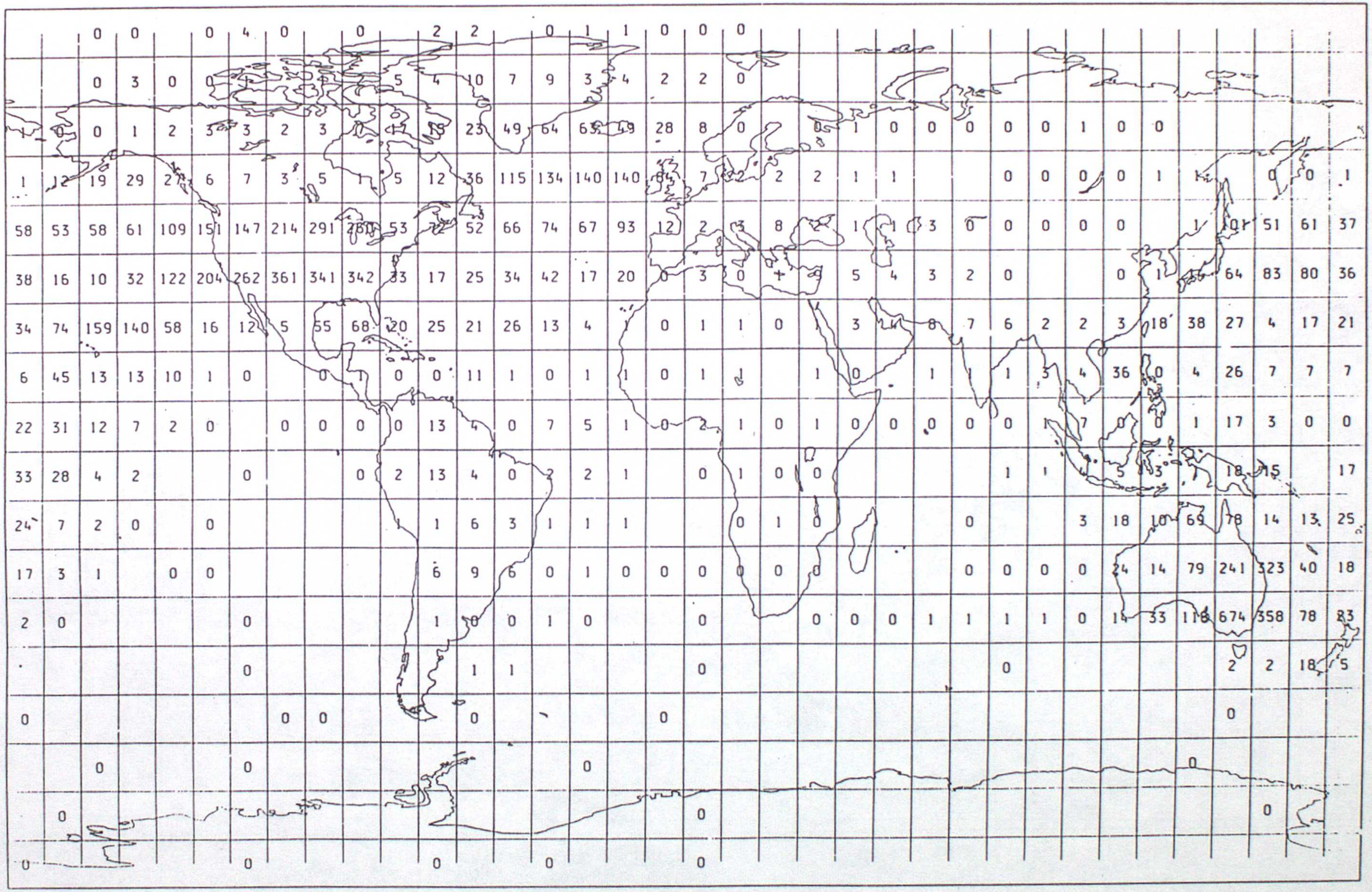
	TEMPERATURE					WIND					
IDENT.	N.REP.	PG	PR	RMS	BIAS	N.REP.	PG	PR	PC	RMS	BIAS
ULE	287	0	2	1.8	0.1	282	0	2	0	6.8	1.4
UPS	923	2	23	2.1	-0.4	929	0	24	1	8.7	1.3
VHT	29	7	3	2.0	0.7	31	0	0	0	7.1	1.7
VIA	711	1	6	1.7	0.3	712	0	8	1	8.5	1.4
VIR	77	1	3	1.7	-0.4	72	0	4	0	8.5	2.4
VRB	20	0	15	2.6	0.2	21	0	10	0	8.1	3.3
VRG	563	1	5	2.2	0.6	556	0	5	0	10.7	1.8
VSP	118	0	14	2.1	0.2	117	0	16	0	10.6	0.4
AL	1234	0	1	1.4	0.4	1147	0	0	0	6.7	0.6
AN	42706	0	45	1.5	0.2	42461	0	45	0	7.5	2.3
BA	14820	0	6	1.7	0.7	14816	0	6	0	7.3	1.5
CO	6101	0	39	1.5	0.8	6072	0	39	0	6.3	1.2
DL	4838	2	3	1.6	0.5	4834	0	18	16	11.7	-2.1
KL	3678	0	86	2.2	1.8	3672	0	11	0	6.8	1.4
LH	1047	0	20	2.0	0.5	999	0	23	3	7.1	0.8
MA	39	5	3	3.5	2.6	36	0	0	0	9.5	-2.1
PA	44	0	0	0.9	-0.2	43	0	0	0	6.1	2.0
QF	10088	0	40	1.4	0.3	10088	0	40	0	7.0	1.4
RE	109	2	5	3.7	2.8	102	0	2	0	8.5	1.7
SR	49	4	12	1.6	0.7	49	0	12	0	9.9	3.1
UA	3920	3	25	1.8	-0.3	3647	0	26	0	9.9	2.0
WA	1109	20	100	1.9	-0.2	991	1	100	52	16.9	-9.8
XX	3517	2	76	1.8	0.6	3502	0	77	1	11.4	1.2
M	250	4	20	3.7	2.9	265	0	20	0	9.6	2.1
N	421	5	12	2.7	0.2	429	0	11	1	8.8	2.1

MEAN DAILY COUNT OF AIREPS AND ASDARS 70 - 500 HPA

JUNE 1993

OBSERVATIONS WITH RMSVW DIFFERENCE > 60 MPS EXCLUDED

FIGURE 3


0 0 0 4 0 0 2 2 0 1 1 0 0 0
0 3 0 0 5 4 10 7 9 3 4 2 2 0
1 0 0 1 2 3 3 2 3 0 17 15 23 49 64 63 49 28 8 0 0 1 0 0 0 0 0 1 0 0
1 12 19 29 2 6 7 3 5 1 5 12 36 115 134 140 140 84 7 32 2 2 1 1 0 0 0 0 1 1 0 0 1
58 53 58 61 109 151 147 214 291 280 53 72 52 66 74 67 93 12 2 3 8 2 1 1 3 0 0 0 0 0 1 101 51 61 37
38 16 10 32 122 204 262 361 341 342 33 17 25 34 42 17 20 0 3 0 5 4 3 2 0 0 1 64 83 80 36
34 74 159 140 58 16 12 5 55 68 20 25 21 26 13 4 1 0 1 1 0 1 3 8 7 6 2 2 3 18 38 27 4 17 21
6 45 13 13 10 1 0 0 1 0 0 11 1 0 1 1 0 1 1 1 0 1 1 1 3 4 36 0 4 26 7 7 7
22 31 12 7 2 0 0 0 0 0 13 4 0 7 5 1 0 2 1 0 1 0 0 0 0 0 1 7 0 0 1 17 3 0 0
33 28 4 2 0 0 2 13 4 0 2 2 1 0 1 0 0 1 1 5 3 18 15 17
24 7 2 0 0 1 1 6 3 1 1 1 0 1 0 0 3 18 10 69 78 14 13 25
17 3 1 0 0 6 9 6 0 1 0 0 0 0 0 0 0 0 0 0 24 14 79 241 323 40 18
2 0 0 1 0 0 1 0 0 0 0 0 1 1 1 1 0 14 33 118 674 358 78 83
0 1 1 0 0 2 2 18 5
0 0 0 0 0 0
0 0 0 0
0 0 0
0 0 0 0 0

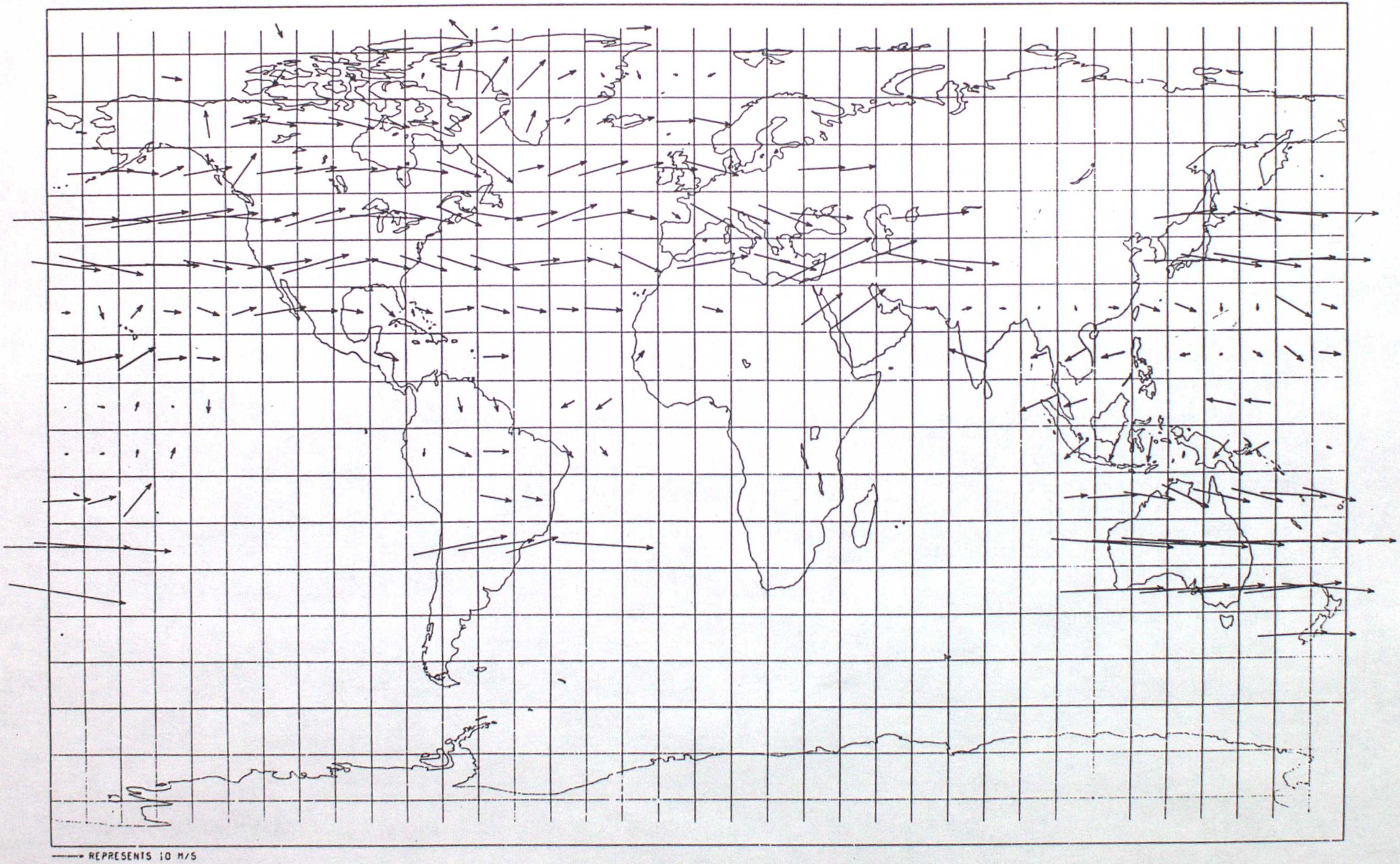
AIREPS & ASDARS MEAN WINDS BETWEEN 70 AND 500 HPA

FIGURE 4

JUNE 1993

OBSERVATIONS WITH RMSVW DIFFERENCE > 60 MPS EXCLUDED

VALUES ARE PRINTED WHERE > 30 OBS ARE PRESENT



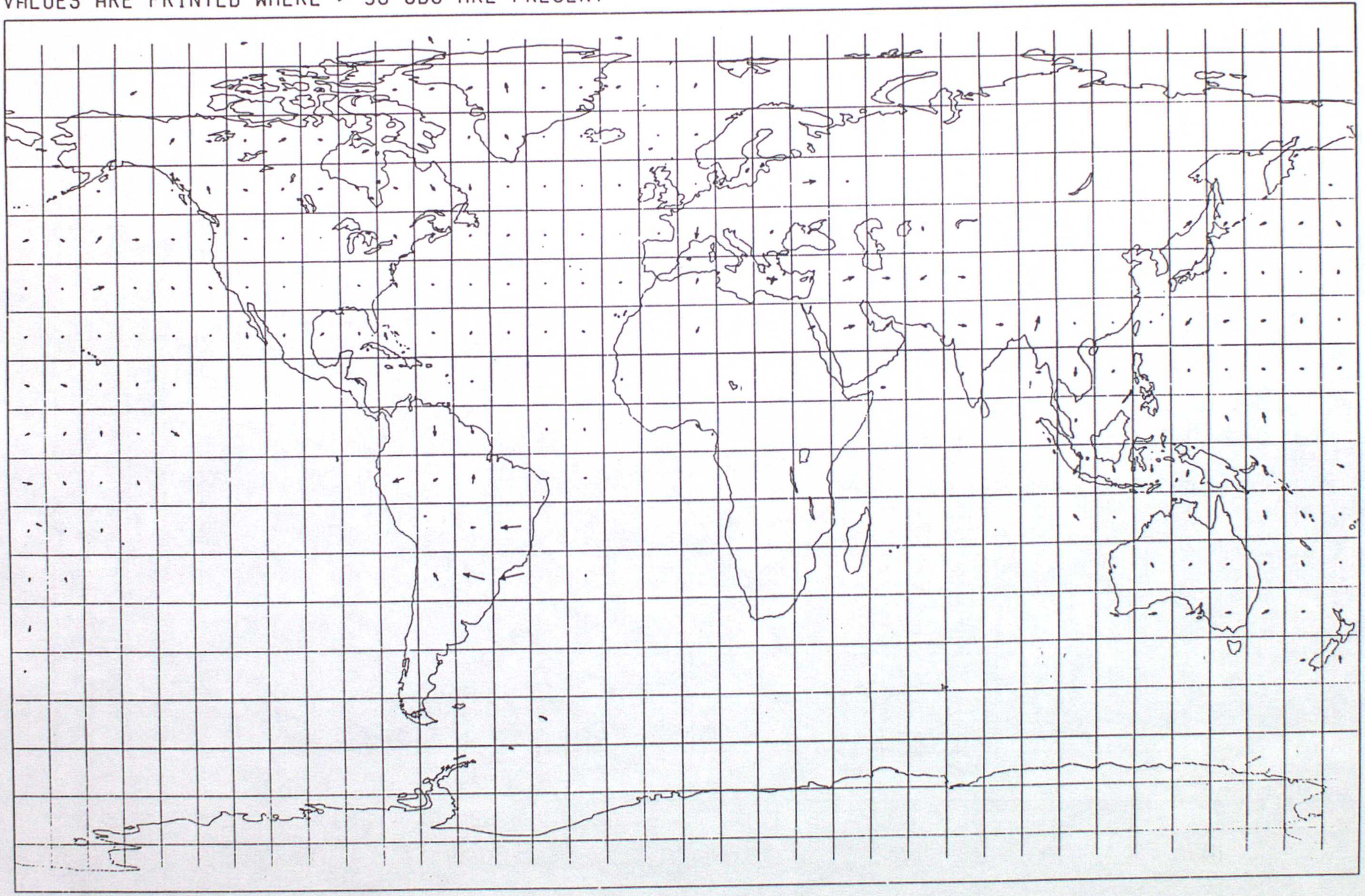
AIREPS & ASDARS MEAN O-B WINDS BETWEEN 70 AND 500 HPA

FIGURE 5

JUNE 1993

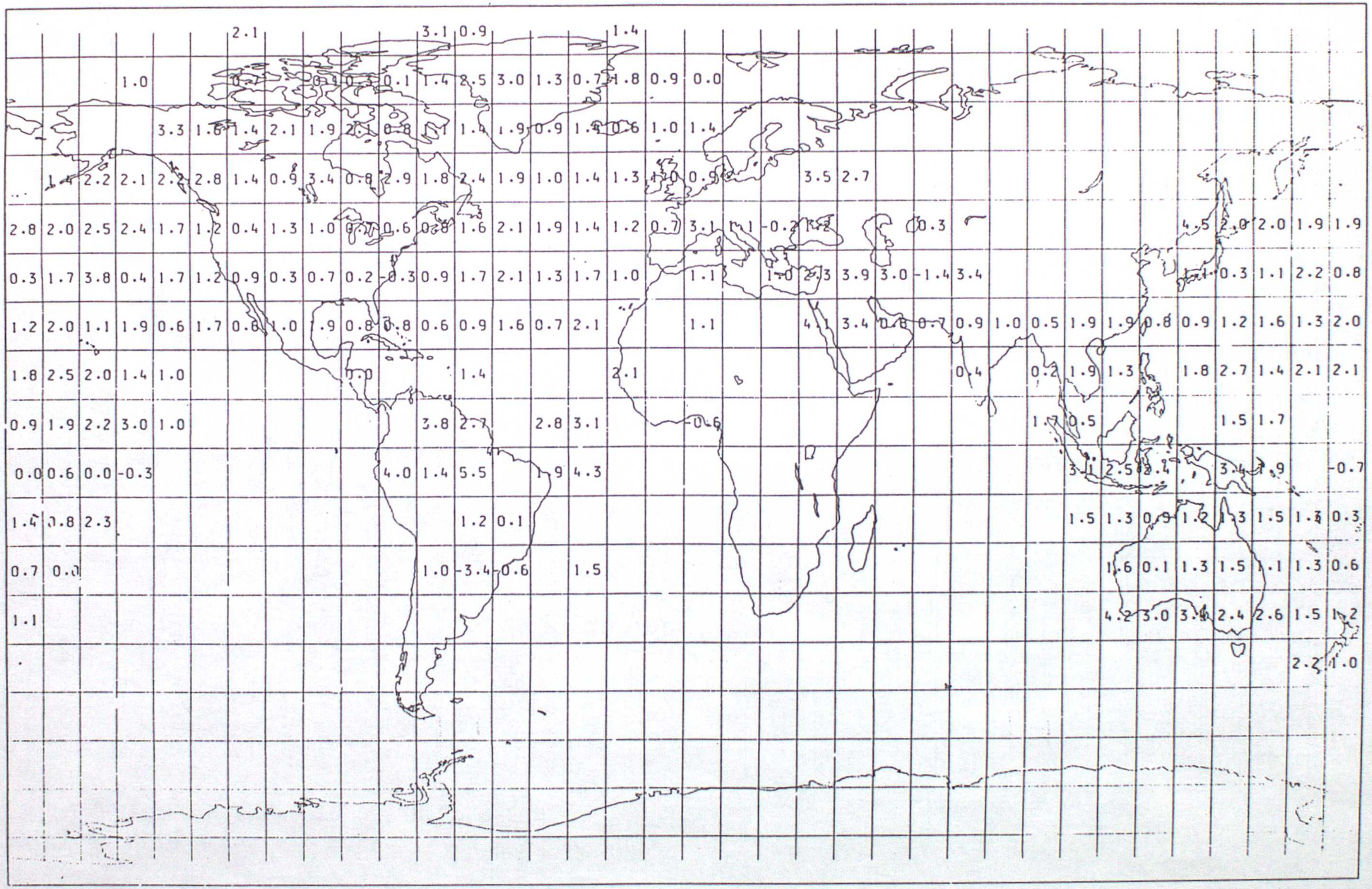
OBSERVATIONS WITH RMSVW DIFFERENCE > 60 MPS EXCLUDED

VALUES ARE PRINTED WHERE > 30 OBS ARE PRESENT

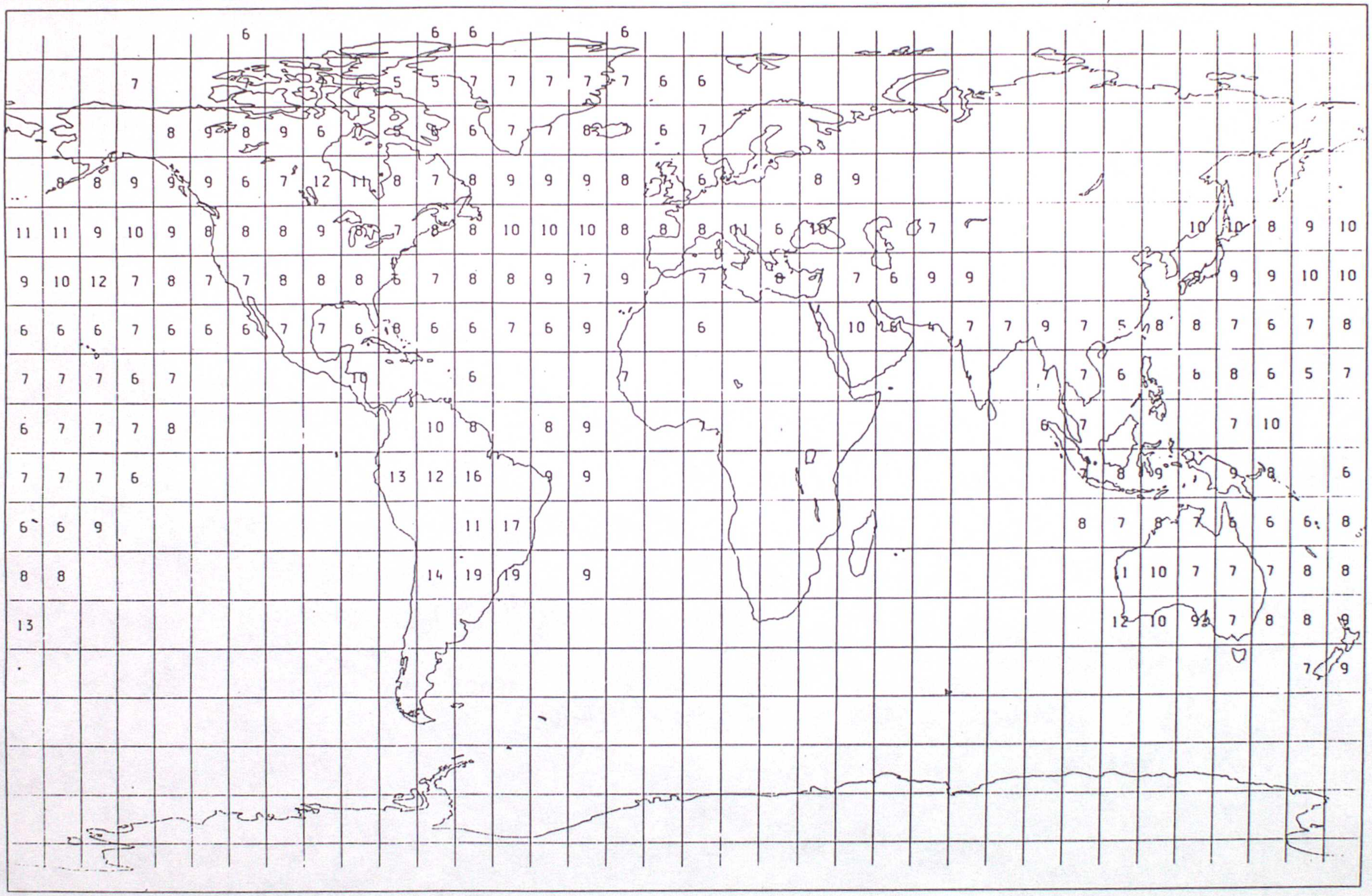


——→ PEPRESENTS 10 M/S

AIREPS & ASDARS : MEAN O-B SPEEDS (M/S) BETWEEN 70 AND 500 HPA FIGURE 6
JUNE 1993
OBSERVATIONS WITH RMSVW DIFFERENCE > 60 MPS EXCLUDED
VALUES ARE PRINTED WHERE > 30 OBS ARE PRESENT


2.1 3.1 0.9 1.4
1.0 0.7 0.1 0.3 0.1 1.4 2.5 3.0 1.3 0.7 1.8 0.9 0.0
3.3 1.6 1.4 2.1 1.9 2.1 0.8 1.1 1.4 1.9 0.9 1.4 0.6 1.0 1.4
1.4 2.2 2.1 2.2 2.8 1.4 0.9 3.4 0.8 2.9 1.8 2.4 1.9 1.0 1.4 1.3 1.0 0.9 3.5 2.7
2.8 2.0 2.5 2.4 1.7 1.2 0.4 1.3 1.0 0.7 0.6 0.8 1.6 2.1 1.9 1.4 1.2 0.7 3.1 1.1 -0.2 1.2 0.3 4.5 2.0 2.0 1.9 1.9
0.3 1.7 3.8 0.4 1.7 1.2 0.9 0.3 0.7 0.2 -0.3 0.9 1.7 2.1 1.3 1.7 1.0 1.1 1.0 2.3 3.9 3.0 -1.4 3.4 1.1 0.3 1.1 2.2 0.8
1.2 2.0 1.1 1.9 0.6 1.7 0.8 1.0 1.9 0.8 0.8 0.6 0.9 1.6 0.7 2.1 1.1 4.1 3.4 0.8 0.7 0.9 1.0 0.5 1.9 1.9 0.8 0.9 1.2 1.6 1.3 2.0
1.8 2.5 2.0 1.4 1.0 0.0 1.4 2.1 0.4 0.2 1.9 1.3 1.8 2.7 1.4 2.1 2.1
0.9 1.9 2.2 3.0 1.0 3.8 2.7 2.8 3.1 -0.6 1.7 0.5 1.5 1.7
0.0 0.6 0.0 -0.3 4.0 1.4 5.5 1.9 4.3 3.1 2.5 2.4 3.4 1.9 -0.7
1.4 0.8 2.3 1.2 0.1 1.5 1.3 0.9 1.2 1.3 1.5 1.3 0.3
0.7 0.0 1.0 -3.4 -0.6 1.5 1.6 0.1 1.3 1.5 1.1 1.3 0.6
1.1 4.2 3.0 3.4 2.4 2.6 1.5 1.2
2.2 1.0

AIREPS & ASDARS : RMS O-B VECTOR (M/S) BETWEEN 70 AND 500 HPA FIGURE 7
JUNE 1993
OBSERVATIONS WITH RMSVW DIFFERENCE > 60 MPS EXCLUDED
VALUES ARE PRINTED WHERE > 30 OBS ARE PRESENT


6 6 6 6
7 5 5 7 7 7 7 7 6 6
8 9 8 9 6 5 8 6 7 7 8 6 7
8 8 9 9 9 6 7 12 11 8 7 8 9 9 9 8 6 8 9
11 11 9 10 9 8 8 8 9 8 7 8 8 10 10 10 8 8 8 11 6 10 7 10 10 8 9 10
9 10 12 7 8 7 7 8 8 8 6 7 8 8 9 7 9 7 8 7 7 6 9 9 9 9 10 10
6 6 6 7 6 6 6 7 7 6 8 6 6 7 6 9 6 7 10 10 4 7 7 9 7 5 8 8 7 6 7 8
7 7 7 6 7 10 6 7 7 7 6 6 8 6 5 7
6 7 7 7 8 10 8 8 9 6 7 7 10
7 7 7 6 13 12 16 9 9 7 8 9 9 8 6
6 6 9 11 17 8 7 8 7 6 6 6 8
8 8 14 19 19 9 11 10 7 7 7 8 8
13 12 10 9 7 8 8 9
7 9

MONITORING OF SATELLITE WINDS

MONITORING CENTRE: BRACKNELL

MONTH: JUNE 1993

Monitoring procedures

Period :One calendar month.

Data monitored :Reports from GOES, METEOSAT, GMS, INSAT.

Standard of comparison :Background field from Bracknell global model.

Selection Criteria :number of observations > 10.

Data Extracted :Layer:
701 - 1000 hPa
401 - 700 hPa
101 - 400 hPa

:Mean wind

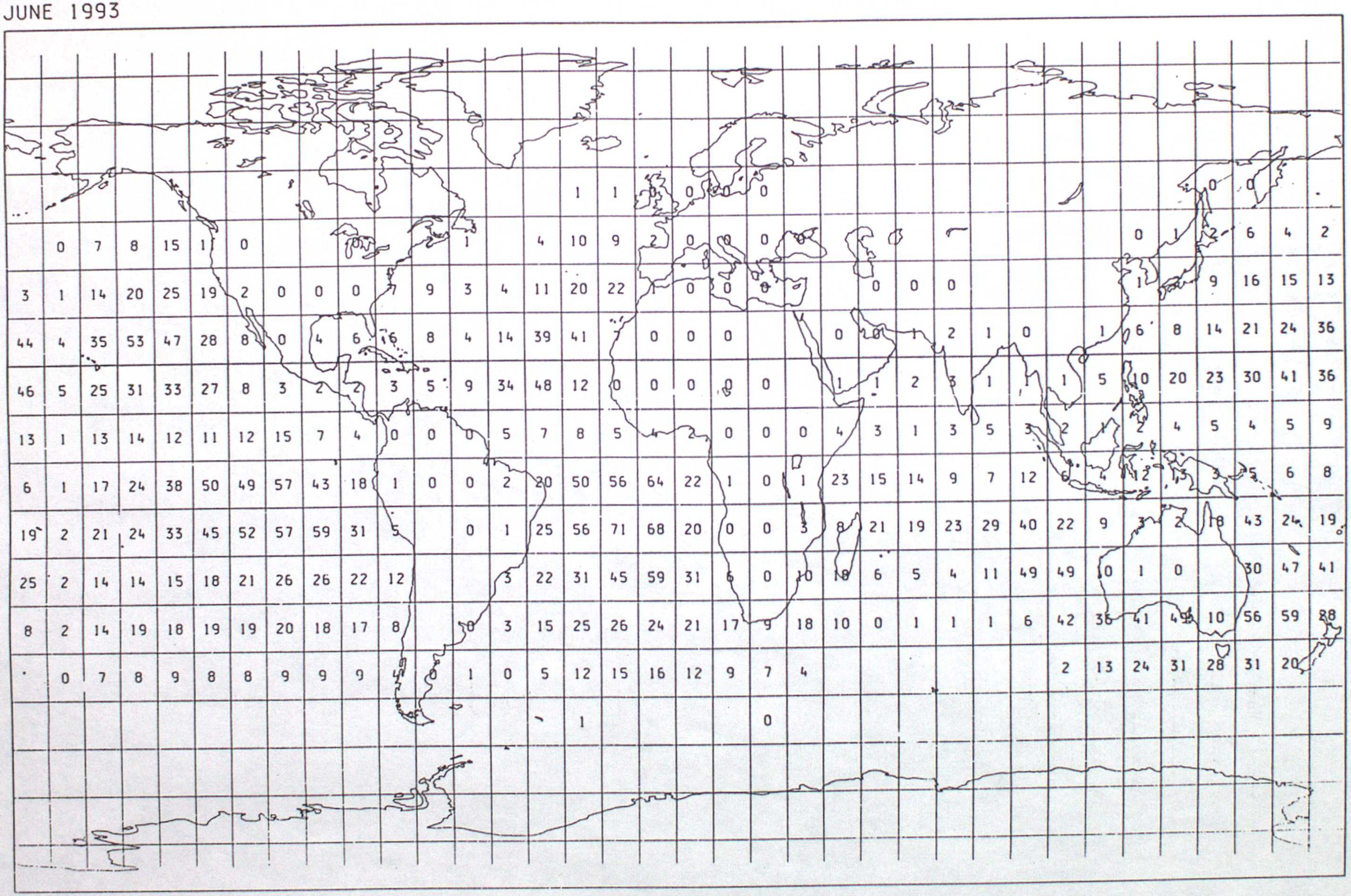
:Mean observation minus background vector wind differences

:Mean observation minus background speed differences

:RMS of observation minus background vector differences

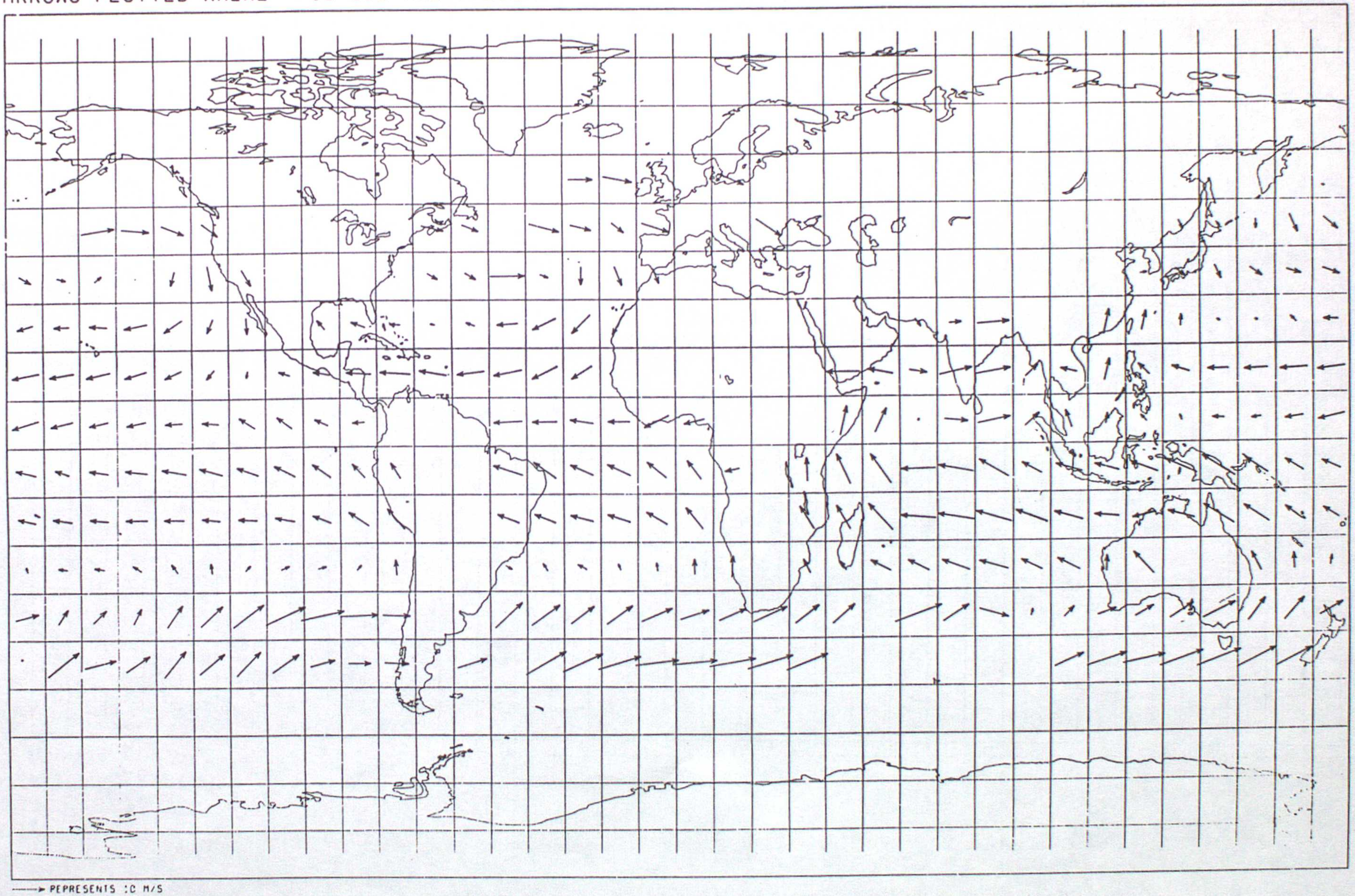
AVERAGE DAILY NUMBER OF SATOB OBSERVATIONS BETWEEN 701 AND 1000 HPA FIGURE 8

JUNE 1993


1 1 0 0 0 0 0 0
0 7 8 15 1 0 1 4 10 9 2 0 0 0 0 1 2 6 4 2
3 1 14 20 25 19 2 0 0 0 7 9 3 4 11 20 22 1 0 0 0 0 0 0 1 9 16 15 13
44 4 35 53 47 28 8 0 4 6 6 8 4 14 39 41 7 0 0 0 0 0 1 2 1 0 1 6 8 14 21 24 36
46 5 25 31 33 27 8 3 2 2 3 5 9 34 48 12 0 0 0 0 0 1 1 2 3 1 1 1 5 10 20 23 30 41 36
13 1 13 14 12 11 12 15 7 4 0 0 0 5 7 8 5 4 2 0 0 0 4 3 1 3 5 3 2 1 2 4 5 4 5 9
6 1 17 24 38 50 49 57 43 18 1 0 0 2 20 50 56 64 22 1 0 1 23 15 14 9 7 12 6 4 12 13 3 5 6 8
19 2 21 24 33 45 52 57 59 31 5 0 1 25 56 71 68 20 0 0 3 8 21 19 23 29 40 22 9 3 2 18 43 24 19
25 2 14 14 15 18 21 26 26 22 12 3 22 31 45 59 31 6 0 10 18 6 5 4 11 49 49 10 1 0 30 47 41
8 2 14 19 18 19 19 20 18 17 8 0 3 15 25 26 24 21 17 9 18 10 0 1 1 1 6 42 36 41 49 10 56 59 28
0 7 8 9 8 8 9 9 9 4 0 1 0 5 12 15 16 12 9 7 4 2 13 24 31 28 31 20
1 0

SATOB VECTOR MEAN WINDS BETWEEN 701-1000 HPA
JUNE 1993
ALL OBSERVATIONS
ARROWS PLOTTED WHERE > 10 OBS ARE PRESENT

FIGURE 9


REPRESENTS 10 M/S

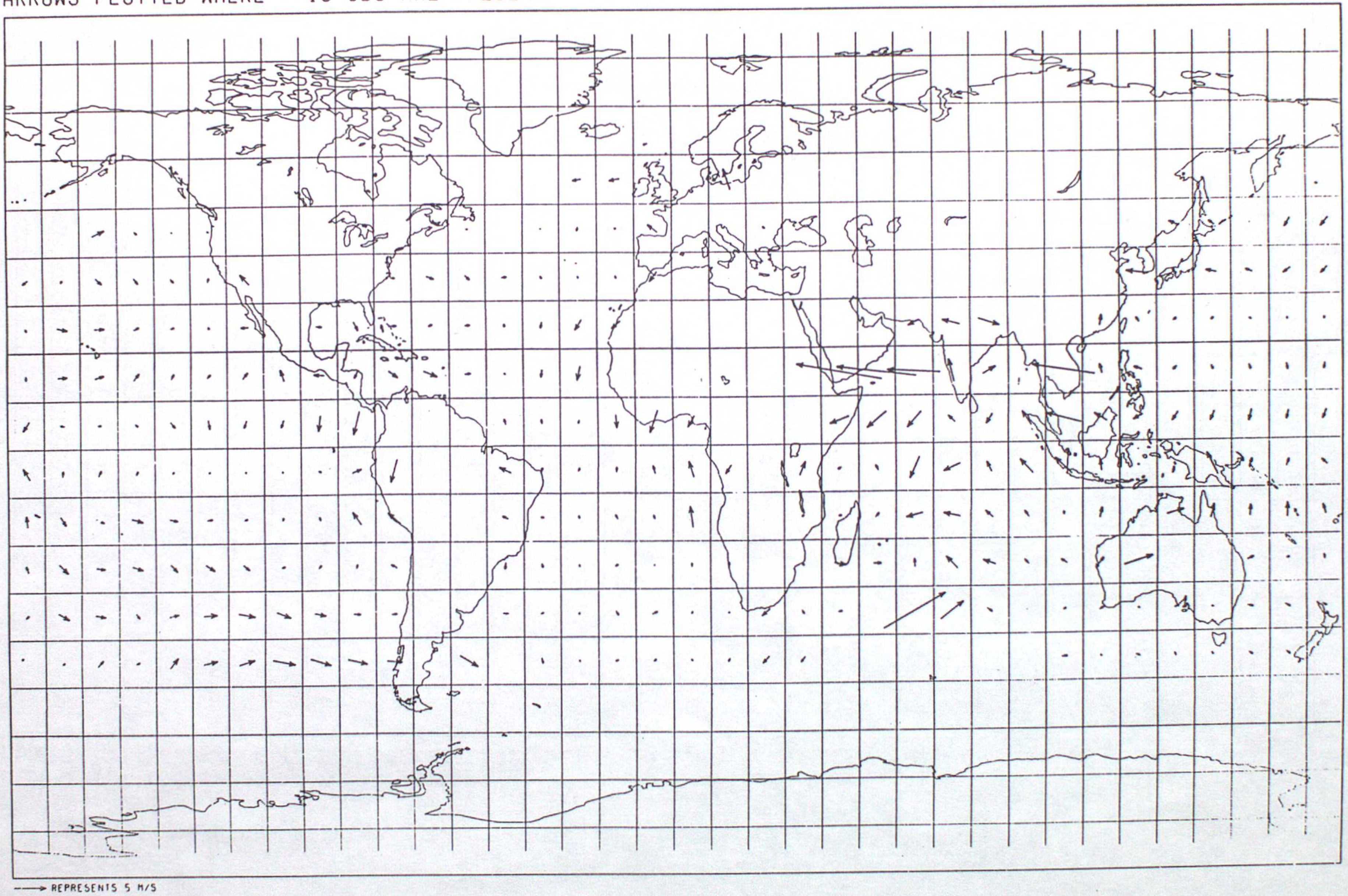
SATOB O-B VECTOR WIND DIFFERENCES BETWEEN 701-1000 HPA

FIGURE 10

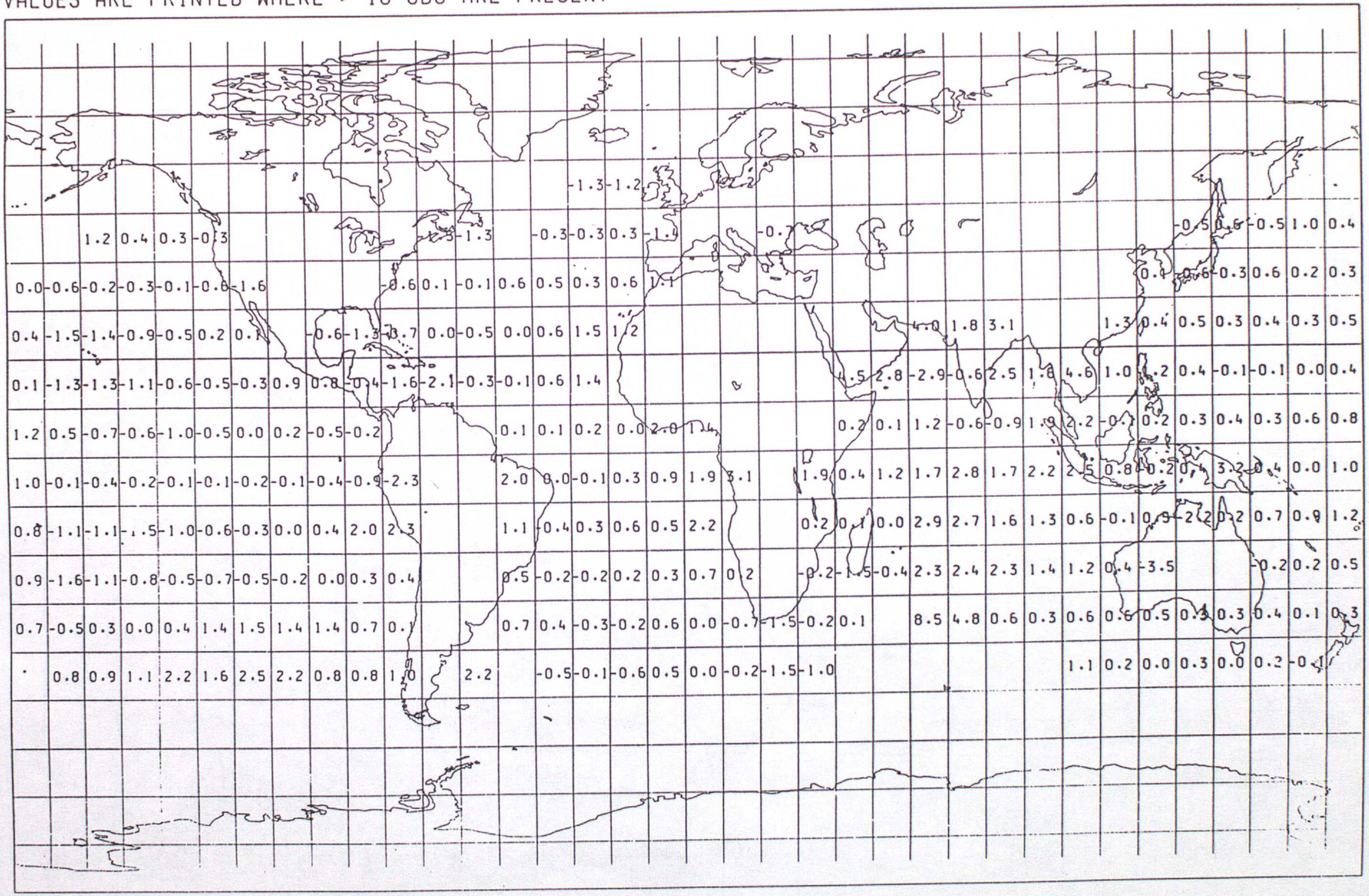
JUNE 1993

ALL OBSERVATIONS

ARROWS PLOTTED WHERE > 10 OBS ARE PRESENT


→ REPRESENTS 5 M/S

SATOBS : MEAN O-B SPEED DIFFERENCES (M/S) BETWEEN 701 AND 1000 HPA FIGURE 11
JUNE 1993
USING ALL OBSERVATIONS
VALUES ARE PRINTED WHERE > 10 OBS ARE PRESENT

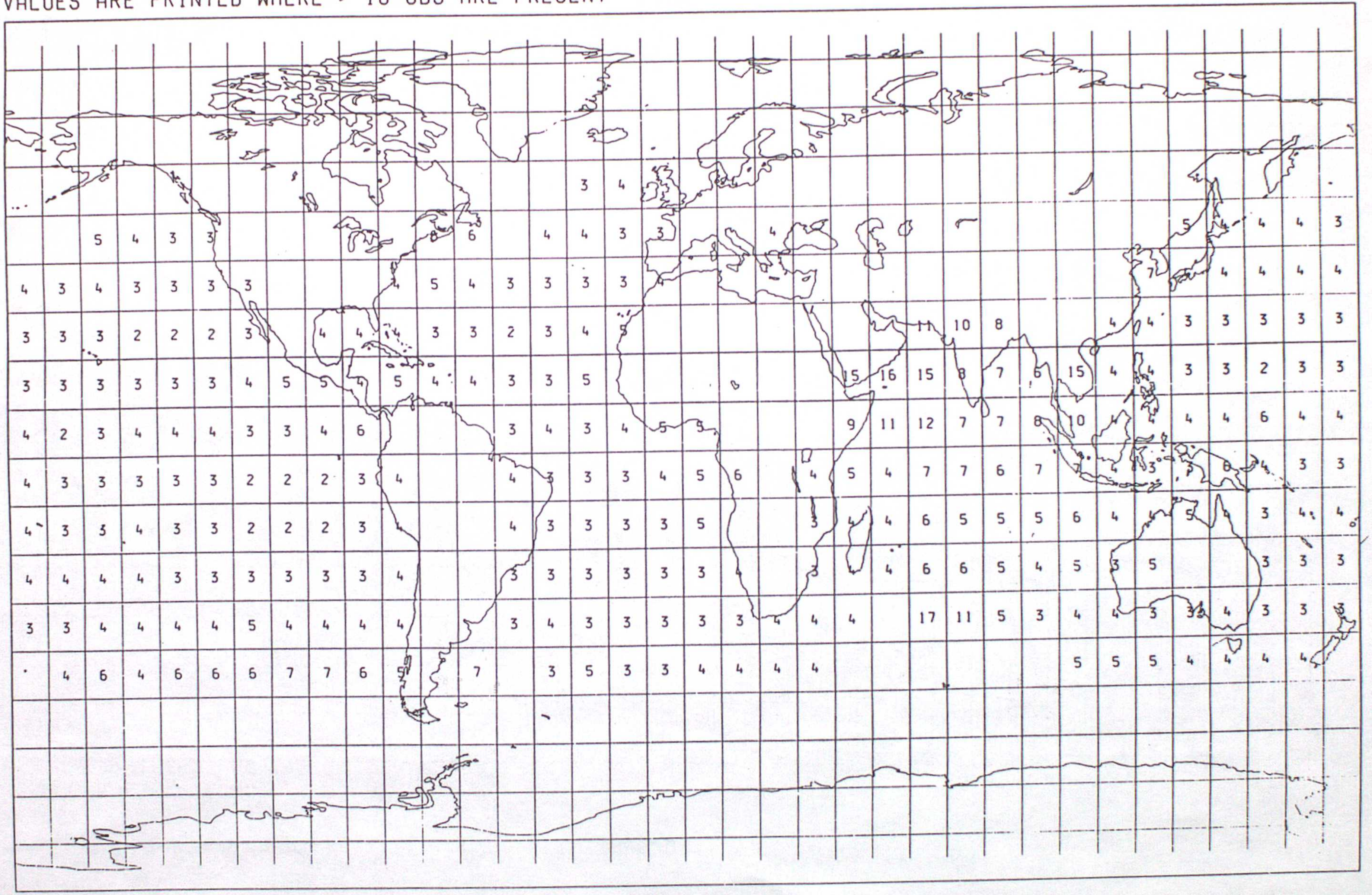

-1.3 -1.2 -2.2
1.2 0.4 0.3 -0.3 -1.3 -1.3 -0.3 -0.3 0.3 -1.4 -0.7 -0.5 0.6 -0.5 1.0 0.4
0.0 -0.6 -0.2 -0.3 -0.1 -0.6 -1.6 -0.6 0.1 -0.1 0.6 0.5 0.3 0.6 1.1 0.4 -0.6 -0.3 0.6 0.2 0.3
0.4 -1.5 -1.4 -0.9 -0.5 0.2 0.1 -0.6 -1.3 -0.7 0.0 -0.5 0.0 0.6 1.5 1.2 4.0 1.8 3.1 1.3 0.4 0.5 0.3 0.4 0.3 0.5
0.1 -1.3 -1.3 -1.1 -0.6 -0.5 -0.3 0.9 0.8 -0.4 -1.6 -2.1 -0.3 -0.1 0.6 1.4 4.5 2.8 -2.9 -0.6 2.5 1.8 4.6 1.0 1.2 0.4 -0.1 -0.1 0.0 0.4
1.2 0.5 -0.7 -0.6 -1.0 -0.5 0.0 0.2 -0.5 -0.2 0.1 0.1 0.2 0.0 2.0 1.4 0.2 0.1 1.2 -0.6 -0.9 1.9 2.2 -0.1 0.2 0.3 0.4 0.3 0.6 0.8
1.0 -0.1 -0.4 -0.2 -0.1 -0.1 -0.2 -0.1 -0.4 -0.9 -2.3 2.0 0.0 -0.1 0.3 0.9 1.9 3.1 1.9 0.4 1.2 1.7 2.8 1.7 2.2 2.5 0.8 -0.2 0.4 3.2 -0.4 0.0 1.0
0.8 -1.1 -1.1 -1.5 -1.0 -0.6 -0.3 0.0 0.4 2.0 2.3 1.1 -0.4 0.3 0.6 0.5 2.2 0.2 0.1 0.0 2.9 2.7 1.6 1.3 0.6 -0.1 0.9 -2.2 0.2 0.7 0.9 1.2
0.9 -1.6 -1.1 -0.8 -0.5 -0.7 -0.5 -0.2 0.0 0.3 0.4 0.5 -0.2 -0.2 0.2 0.3 0.7 0.2 -0.2 -1.5 -0.4 2.3 2.4 2.3 1.4 1.2 0.4 -3.5 -0.2 0.2 0.5
0.7 -0.5 0.3 0.0 0.4 1.4 1.5 1.4 1.4 0.7 0.1 0.7 0.4 -0.3 -0.2 0.6 0.0 -0.7 -1.5 -0.2 0.1 8.5 4.8 0.6 0.3 0.6 0.6 0.5 0.3 0.3 0.4 0.1 0.3
0.8 0.9 1.1 2.2 1.6 2.5 2.2 0.8 0.8 1.0 2.2 -0.5 -0.1 -0.6 0.5 0.0 -0.2 -1.5 -1.0 1.1 0.2 0.0 0.3 0.0 0.2 -0.1

SATOBS : RMS O-B VECTOR DIFFERENCES (M/S) BETWEEN 701 AND 1000 HPA FIGURE 12

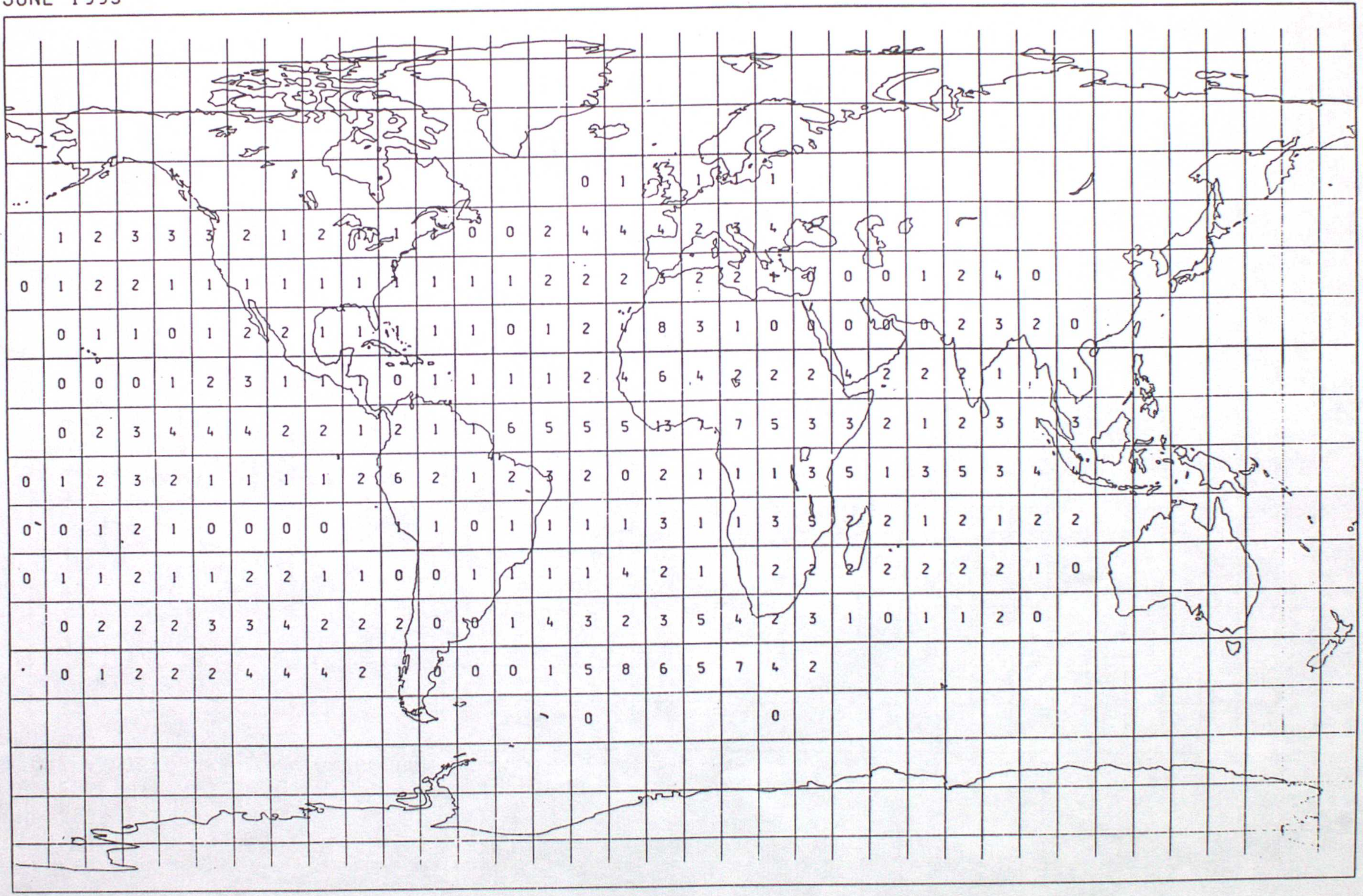
JUNE 1993

USING ALL OBSERVATIONS

VALUES ARE PRINTED WHERE > 10 OBS ARE PRESENT


3 4
5 4 3 3 8 6 4 4 3 3 4 5 4 4 4 3
4 3 4 3 3 3 3 4 5 4 3 3 3 3 4 7 4 4 4 4
3 3 3 2 2 2 3 4 4 4 3 3 2 3 4 5 11 10 8 4 4 3 3 3 3 3
3 3 3 3 3 3 4 5 5 4 5 4 4 3 3 5 15 16 15 8 7 6 15 4 4 3 3 2 3 3
4 2 3 4 4 4 3 3 4 6 3 4 3 4 5 5 9 11 12 7 7 8 10 4 4 4 4 6 4 4
4 3 3 3 3 3 2 2 2 3 4 4 3 3 3 4 5 6 4 5 4 7 7 6 7 7 4 3 3 8 4 3 3
4 3 3 4 3 3 2 2 2 3 4 4 3 3 3 3 5 3 4 4 6 5 5 5 6 4 4 5 3 4 4
4 4 4 4 3 3 3 3 3 3 4 3 3 3 3 3 3 4 3 4 6 6 5 4 5 3 5 3 3 3
3 3 4 4 4 4 5 4 4 4 4 3 4 3 3 3 3 3 4 4 4 17 11 5 3 4 4 3 3 4 3 3 3
4 6 4 6 6 6 7 7 6 5 7 3 5 3 3 4 4 4 4 5 5 5 4 4 4 4

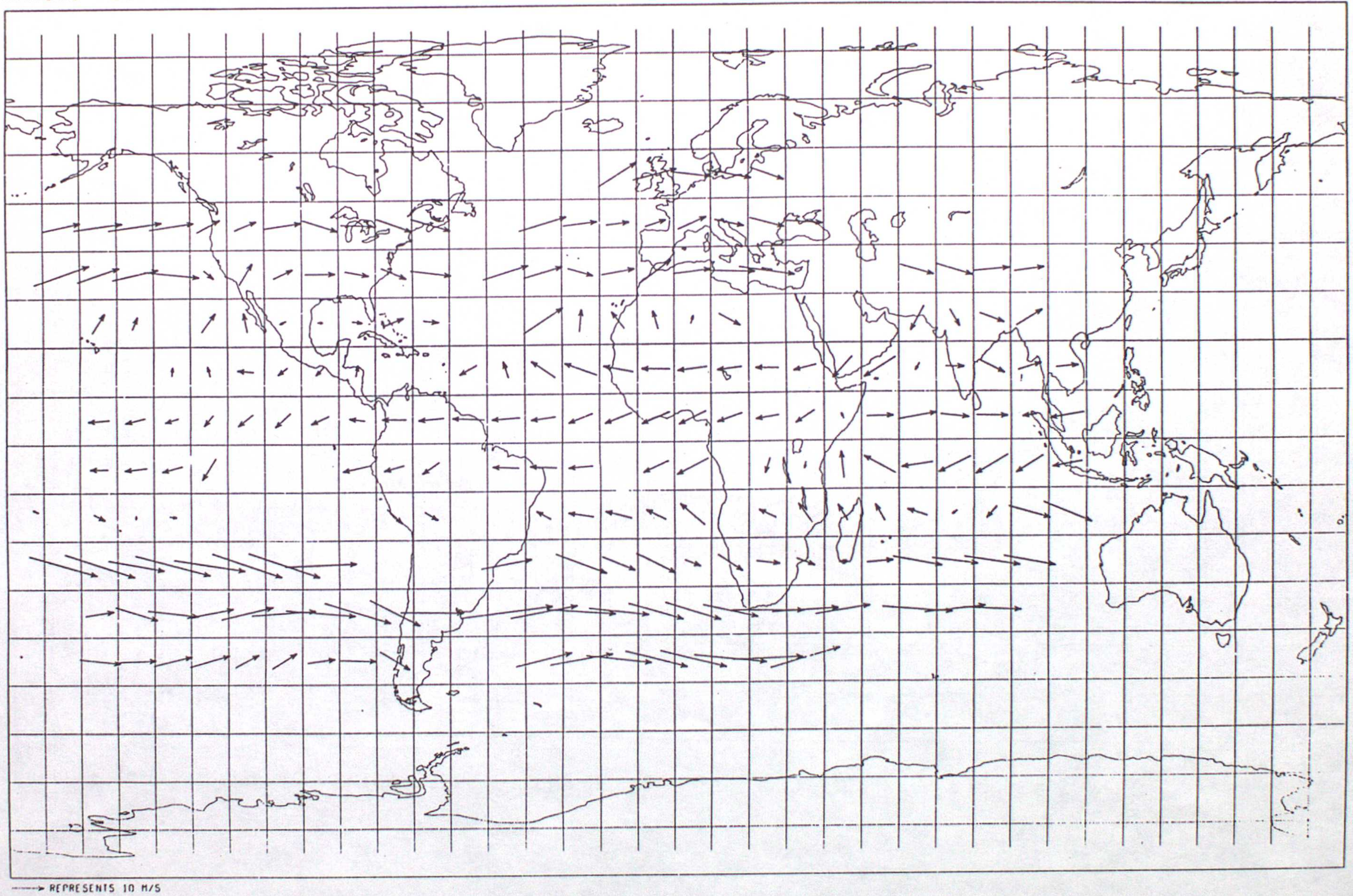
AVERAGE DAILY NUMBER OF SATOB OBSERVATIONS BETWEEN 401 AND 700 HPA FIGURE 13
JUNE 1993



0 1 1 1
1 2 3 3 3 2 1 2 1 1 0 0 2 4 4 4 2 3 4
0 1 2 2 1 1 1 1 1 1 1 1 1 1 2 2 2 3 2 2 4 0 0 0 1 2 4 0
0 1 1 0 1 2 2 1 1 1 1 1 0 1 2 4 8 3 1 0 0 0 0 0 2 3 2 0
0 0 0 1 2 3 1 1 1 0 1 1 1 1 2 4 6 4 2 2 2 4 2 2 2 1 1 1
0 2 3 4 4 4 2 2 1 2 1 1 6 5 5 5 13 7 7 5 3 3 2 1 2 3 1 3
0 1 2 3 2 1 1 1 1 2 6 2 1 2 3 2 0 2 1 1 1 3 5 1 3 5 3 4
0 0 1 2 1 0 0 0 0 1 1 0 1 1 1 1 3 1 1 3 5 2 2 1 2 1 2 2
0 1 1 2 1 1 2 2 1 1 0 0 1 1 1 1 4 2 1 2 2 2 2 2 2 2 1 0
0 2 2 2 3 3 4 2 2 2 0 0 1 4 3 2 3 5 4 2 3 1 0 1 1 2 0
0 1 2 2 2 4 4 4 2 0 0 0 1 5 8 6 5 7 4 2
0 0

SATOB VECTOR MEAN WINDS BETWEEN 401-700 HPA
JUNE 1993
ALL OBSERVATIONS
ARROWS PLOTTED WHERE > 10 OBS ARE PRESENT

FIGURE 14


REPRESENTS 10 M/S

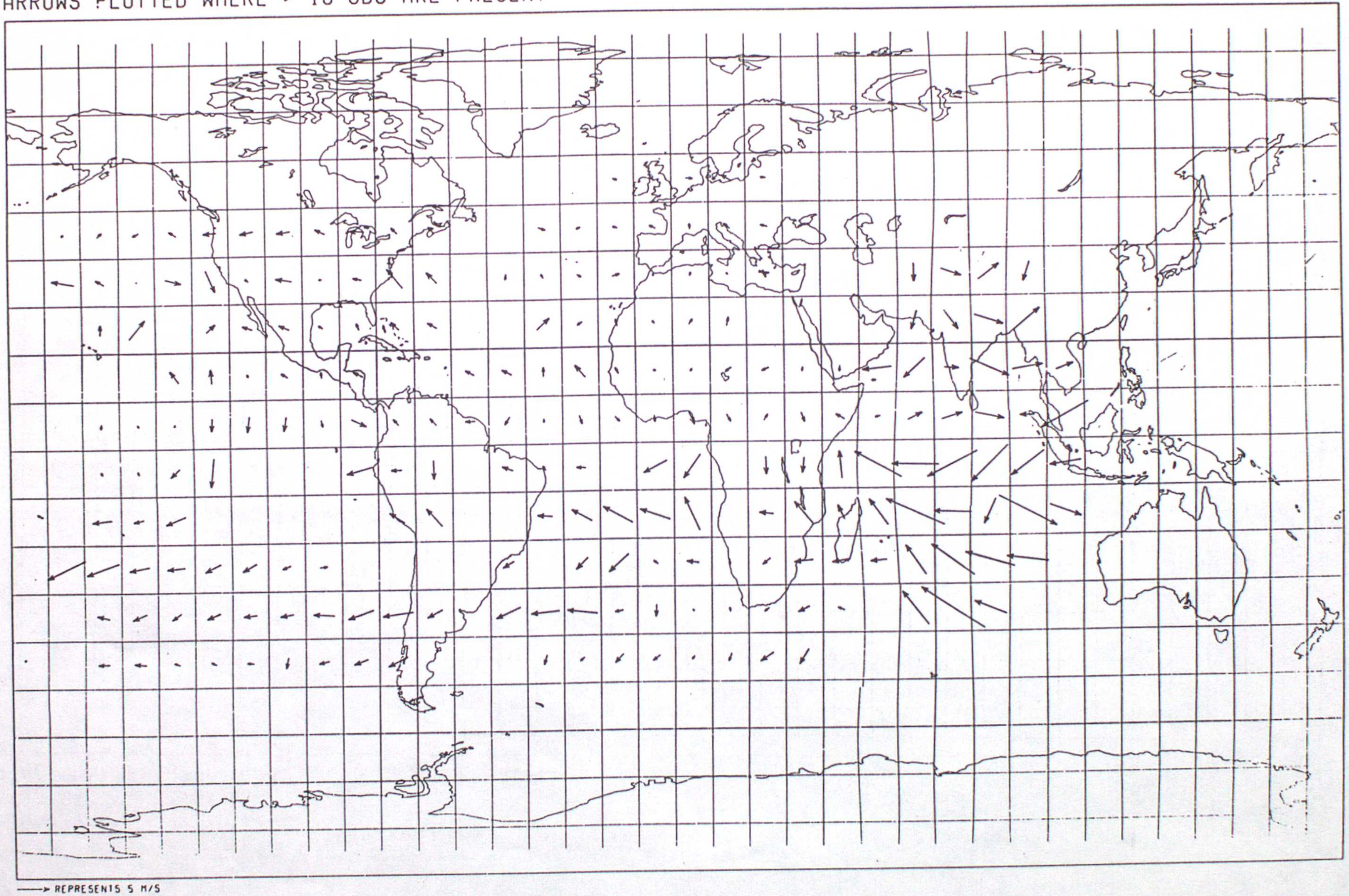
SATOB O-B VECTOR WIND DIFFERENCES BETWEEN 401-700 HPA

JUNE 1993

ALL OBSERVATIONS

ARROWS PLOTTED WHERE > 10 OBS ARE PRESENT

FIGURE 15



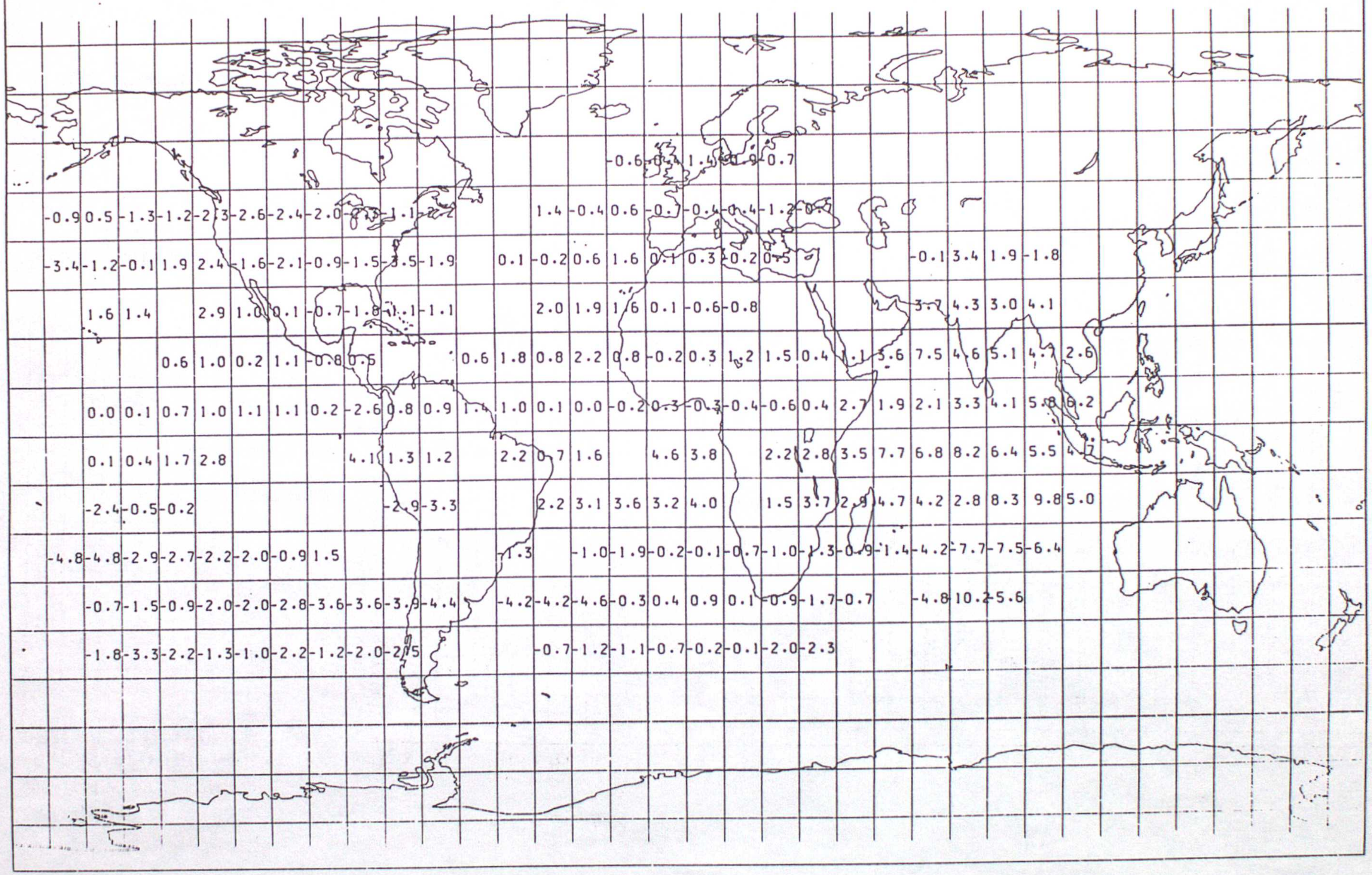
——→ REPRESENTS 5 M/S

SATOBS : MEAN O-B SPEED DIFFERENCES (M/S) BETWEEN 401 AND 700 HPA FIGURE 16

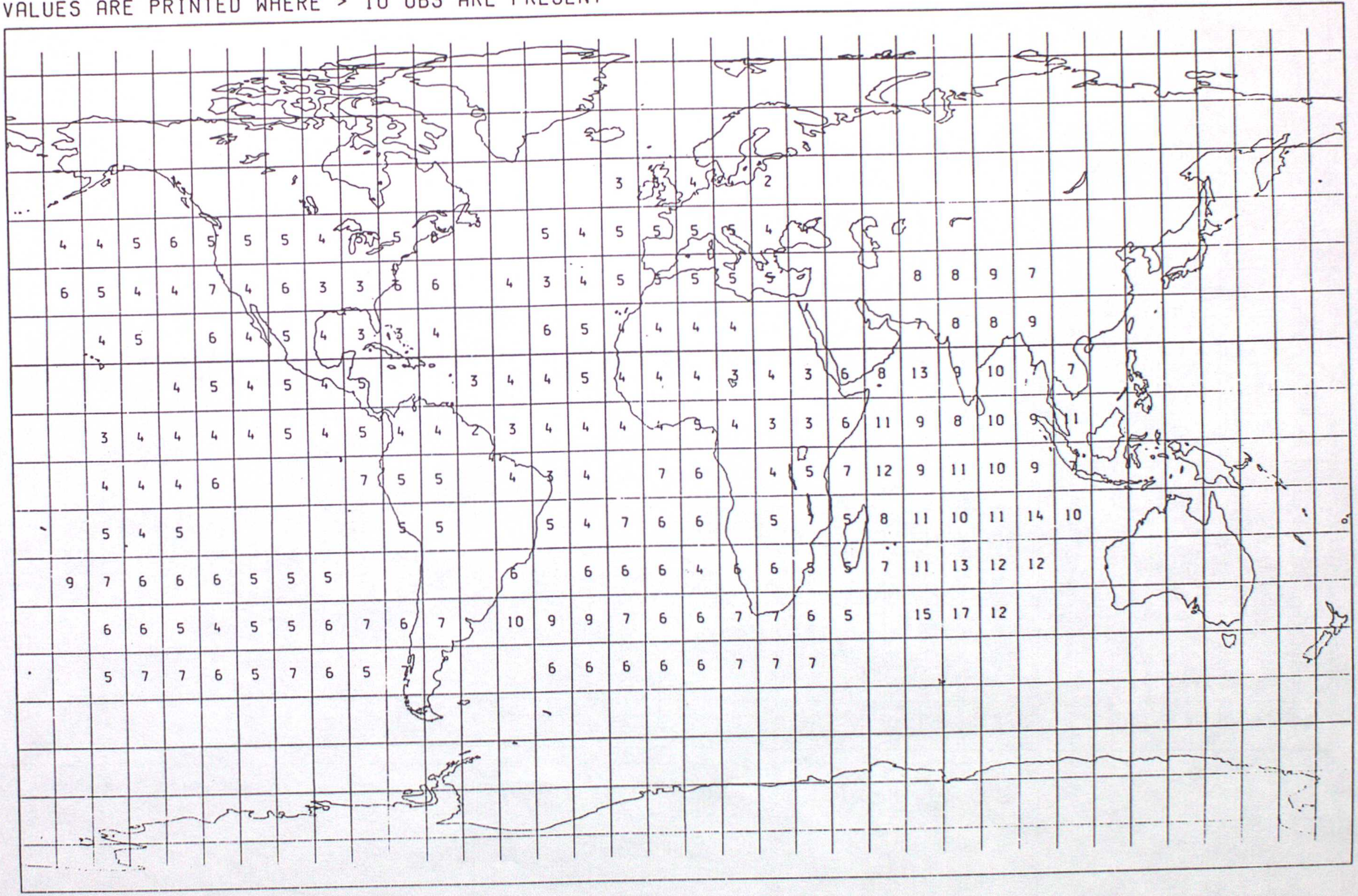
JUNE 1993

USING ALL OBSERVATIONS

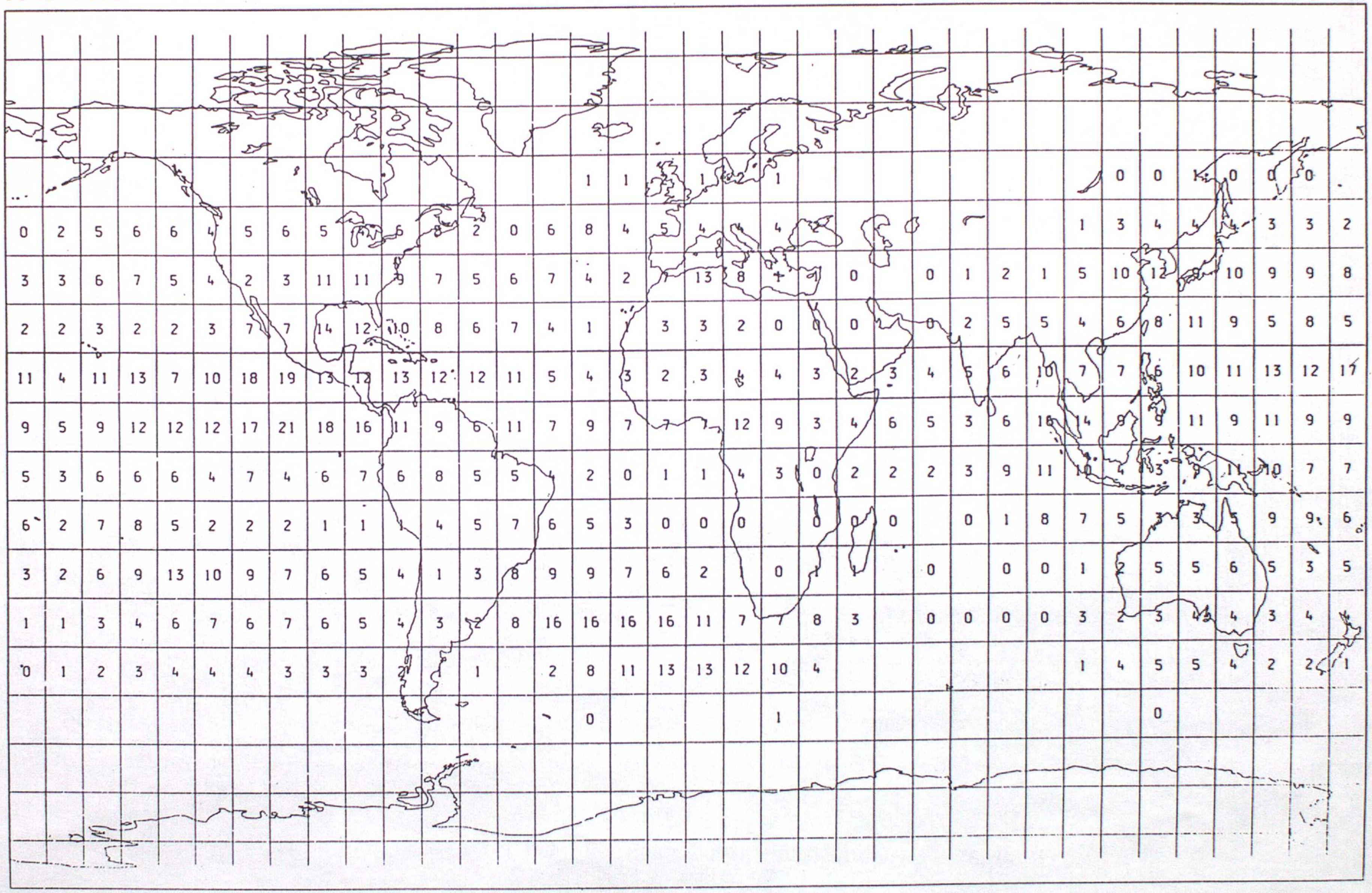
VALUES ARE PRINTED WHERE > 10 OBS ARE PRESENT


-0.6 -0.4 1.4 -0.9 -0.7
-0.9 0.5 -1.3 -1.2 -2.3 -2.6 -2.4 -2.0 -2.3 -1.1 -2.2 1.4 -0.4 0.6 -0.7 -0.4 -0.4 -1.2 -0.7
-3.4 -1.2 -0.1 1.9 2.4 -1.6 -2.1 -0.9 -1.5 -3.5 -1.9 0.1 -0.2 0.6 1.6 0.1 0.3 -0.2 0.5 -0.1 3.4 1.9 -1.8
1.6 1.4 2.9 1.0 0.1 -0.7 -1.8 -1.1 -1.1 2.0 1.9 1.6 0.1 -0.6 -0.8 3.7 4.3 3.0 4.1
0.6 1.0 0.2 1.1 -0.8 0.5 0.6 1.8 0.8 2.2 0.8 -0.2 0.3 1.2 1.5 0.4 1.1 3.6 7.5 4.6 5.1 4.7 2.6
0.0 0.1 0.7 1.0 1.1 1.1 0.2 -2.6 0.8 0.9 1.4 1.0 0.1 0.0 -0.2 0.3 -0.3 -0.4 -0.6 0.4 2.7 1.9 2.1 3.3 4.1 5.8 6.2
0.1 0.4 1.7 2.8 4.1 1.3 1.2 2.2 0.7 1.6 4.6 3.8 2.2 2.8 3.5 7.7 6.8 8.2 6.4 5.5 4.7
-2.4 -0.5 -0.2 -2.9 -3.3 2.2 3.1 3.6 3.2 4.0 1.5 3.7 2.9 4.7 4.2 2.8 8.3 9.8 5.0
-4.8 -4.8 -2.9 -2.7 -2.2 -2.0 -0.9 1.5 -1.3 -1.0 -1.9 -0.2 -0.1 -0.7 -1.0 -1.3 -0.9 -1.4 -4.2 -7.7 -7.5 -6.4
-0.7 -1.5 -0.9 -2.0 -2.0 -2.8 -3.6 -3.6 -3.9 -4.4 -4.2 -4.2 -4.6 -0.3 0.4 0.9 0.1 -0.9 -1.7 -0.7 -4.8 10.2 5.6
-1.8 -3.3 -2.2 -1.3 -1.0 -2.2 -1.2 -2.0 -2.5 -0.7 -1.2 -1.1 -0.7 -0.2 -0.1 -2.0 -2.3

SATOBS : RMS O-B VECTOR DIFFERENCES (M/S) BETWEEN 401 AND 700 HPA FIGURE 17
JUNE 1993
USING ALL OBSERVATIONS
VALUES ARE PRINTED WHERE > 10 OBS ARE PRESENT


3 4 2
4 4 5 6 5 5 5 4 5 5 4 5 5 5 5 4
6 5 4 4 7 4 6 3 3 6 6 4 3 4 5 5 5 5 5 8 8 9 7
4 5 6 4 5 4 3 3 4 6 5 4 4 4 4 7 8 8 9
4 5 4 5 4 5 3 4 4 5 4 4 4 3 4 3 6 8 13 9 10 7 7
3 4 4 4 4 5 4 5 4 4 2 3 4 4 4 4 5 4 3 3 6 11 9 8 10 9 11
4 4 4 6 7 5 5 4 3 4 7 6 4 5 7 12 9 11 10 9
5 4 5 5 5 5 4 7 6 6 5 7 5 8 11 10 11 14 10
9 7 6 6 6 5 5 5 6 6 6 6 4 6 6 5 5 7 11 13 12 12
6 6 5 4 5 5 6 7 6 7 10 9 9 7 6 6 7 7 6 5 15 17 12
5 7 7 6 5 7 6 5 7 6 6 6 6 6 7 7 7

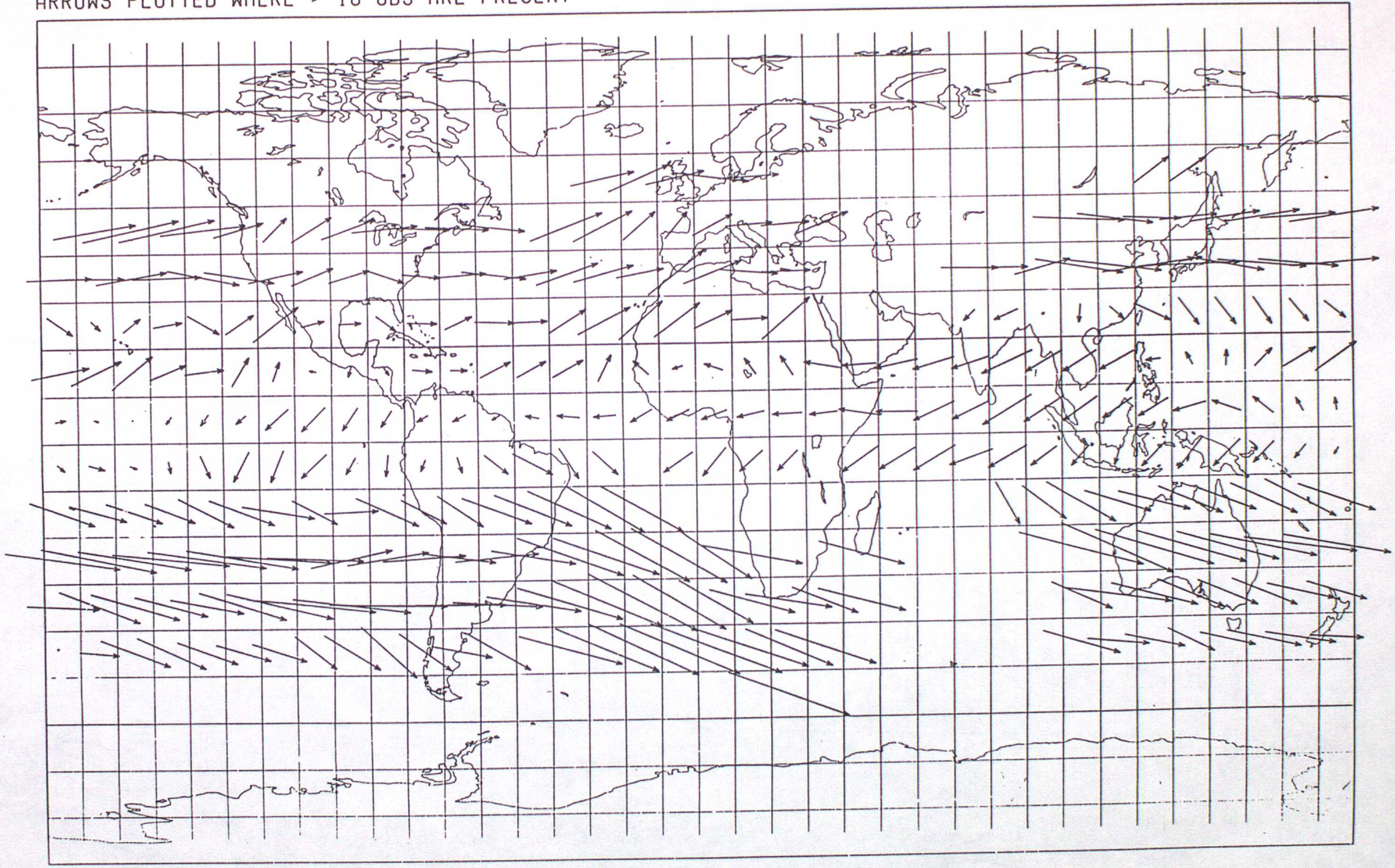
AVERAGE DAILY NUMBER OF SATOB OBSERVATIONS BETWEEN 101 AND 400 HPA FIGURE 18
JUNE 1993



															1	1		1	2	1									0	0	1	0	0	0	
0	2	5	6	6	4	5	6	5	4	6	8	2	0	6	8	4	5	4	4	4	2							1	3	4	4	4	3	3	2
3	3	6	7	5	4	2	3	11	11	9	7	5	6	7	4	2	7	13	8	4	1	0		0	1	2	1	5	10	12	9	10	9	9	8
2	2	3	2	2	3	7	7	14	12	10	8	6	7	4	1	1	3	3	2	0	0	0		0	2	5	5	4	6	8	11	9	5	8	5
11	4	11	13	7	10	18	19	13	12	13	12	12	11	5	4	3	2	3	4	4	3	2	3	4	5	6	10	7	7	6	10	11	13	12	17
9	5	9	12	12	12	17	21	18	16	11	9	6	11	7	9	7	7	7	12	9	3	4	6	5	3	6	16	14	9	9	11	9	11	9	9
5	3	6	6	6	4	7	4	6	7	6	8	5	5	4	2	0	1	1	4	3	0	2	2	2	3	9	11	10	4	3	9	11	10	7	7
6	2	7	8	5	2	2	2	1	1	1	4	5	7	6	5	3	0	0	0		0	0	0		0	1	8	7	5	3	3	5	9	9	6
3	2	6	9	13	10	9	7	6	5	4	1	3	8	9	9	7	6	2	1	0	1	1		0		0	0	1	2	5	5	6	5	3	5
1	1	3	4	6	7	6	7	6	5	4	3	2	8	16	16	16	16	11	7	7	8	3		0	0	0	0	3	2	3	4	4	3	4	4
0	1	2	3	4	4	4	3	3	3	2	1	1		2	8	11	13	13	12	10	4							1	4	5	5	4	2	2	1
															0					1										0					

FIGURE 19

SATOB VECTOR MEAN WINDS BETWEEN 101-400 HPA
JUNE 1993
ALL OBSERVATIONS
ARROWS PLOTTED WHERE > 10 OBS ARE PRESENT



→ REPRESENTS 10 M/S

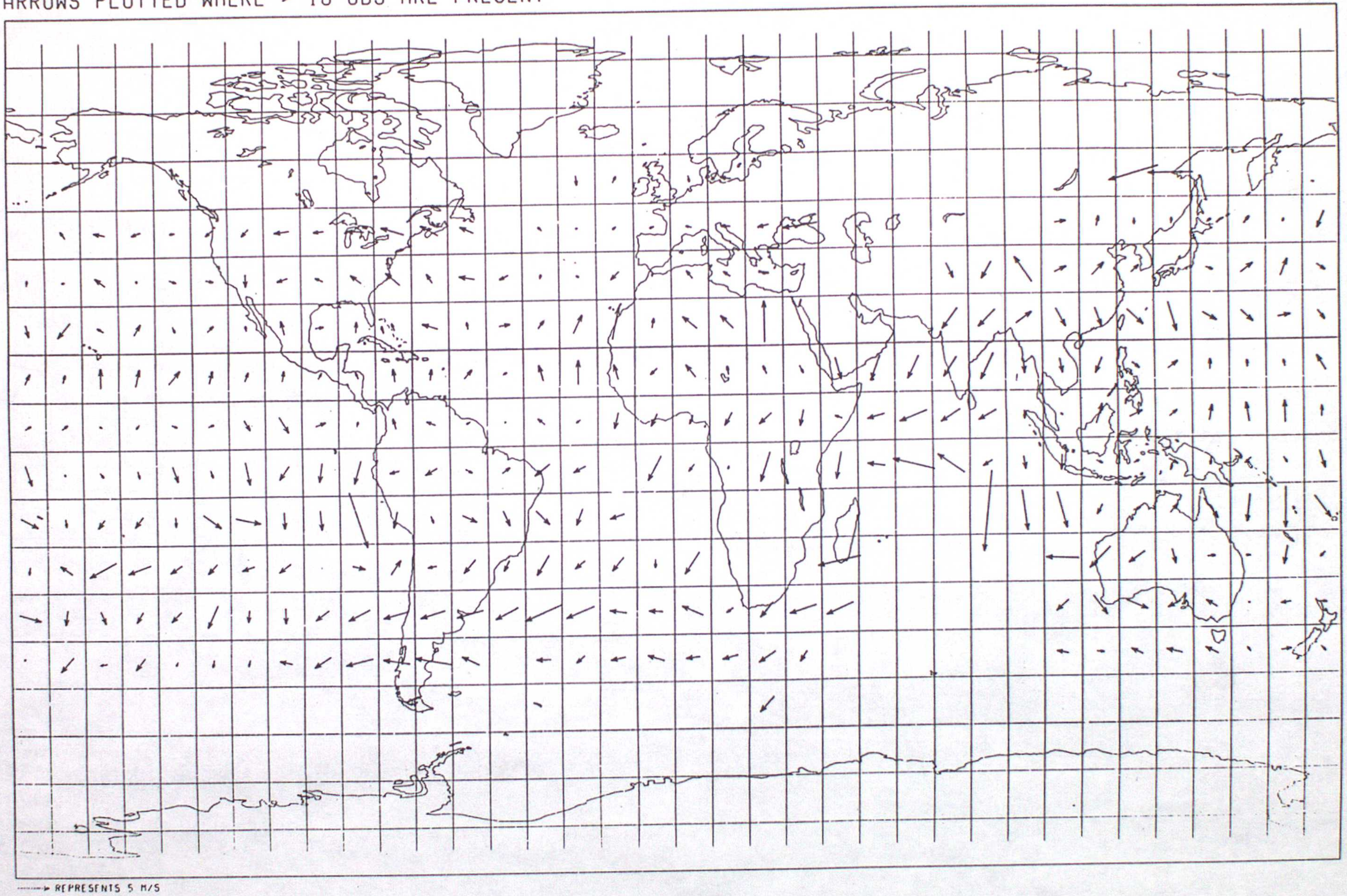
SATOB O-B VECTOR WIND DIFFERENCES BETWEEN 101-400 HPA

JUNE 1993

ALL OBSERVATIONS

ARROWS PLOTTED WHERE > 10 OBS ARE PRESENT

FIGURE 20

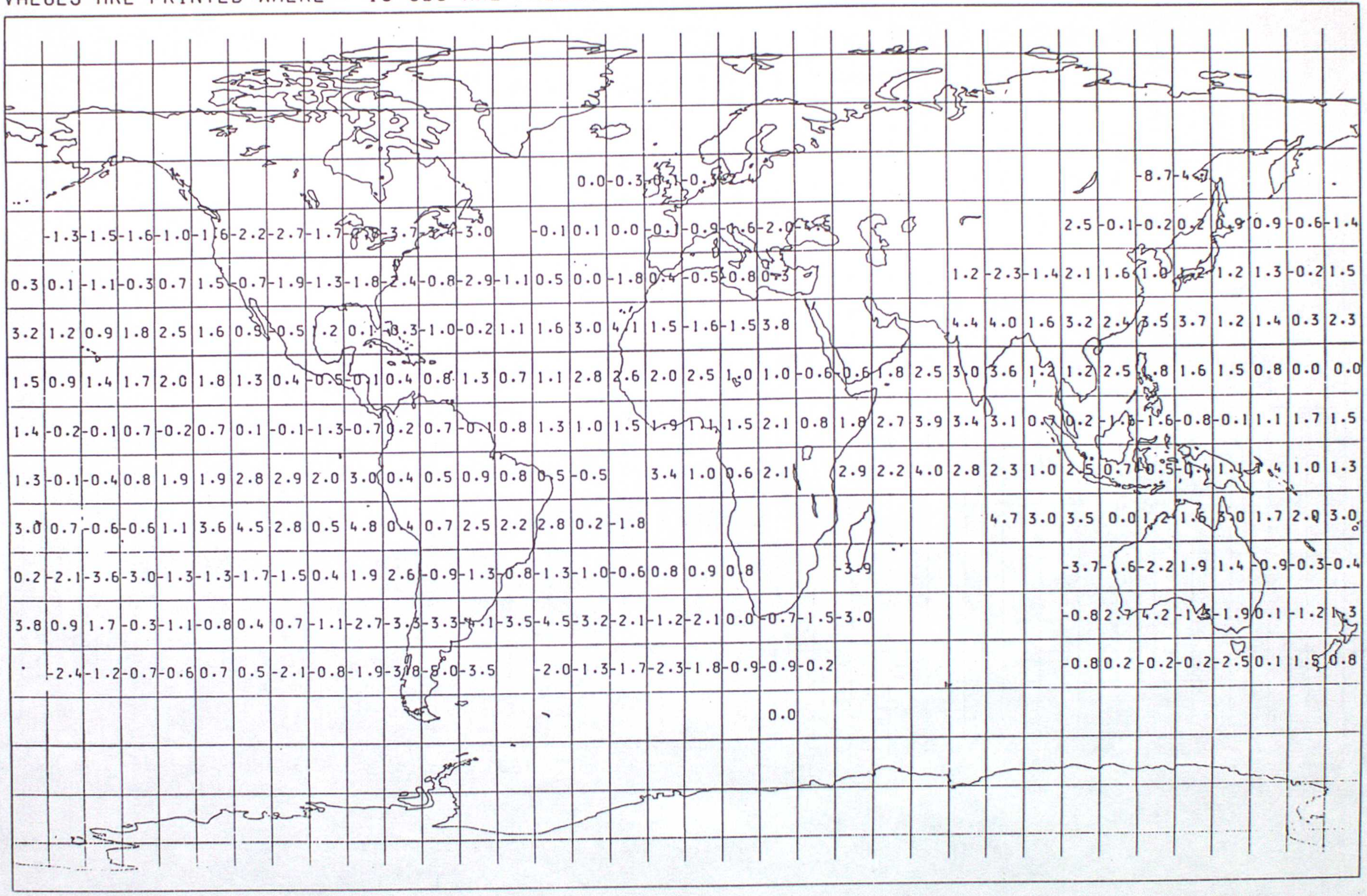

→ REPRESENTS 5 M/S

SATOBS : MEAN O-B SPEED DIFFERENCES (M/S) BETWEEN 101 AND 400 HPA FIGURE 21

JUNE 1993

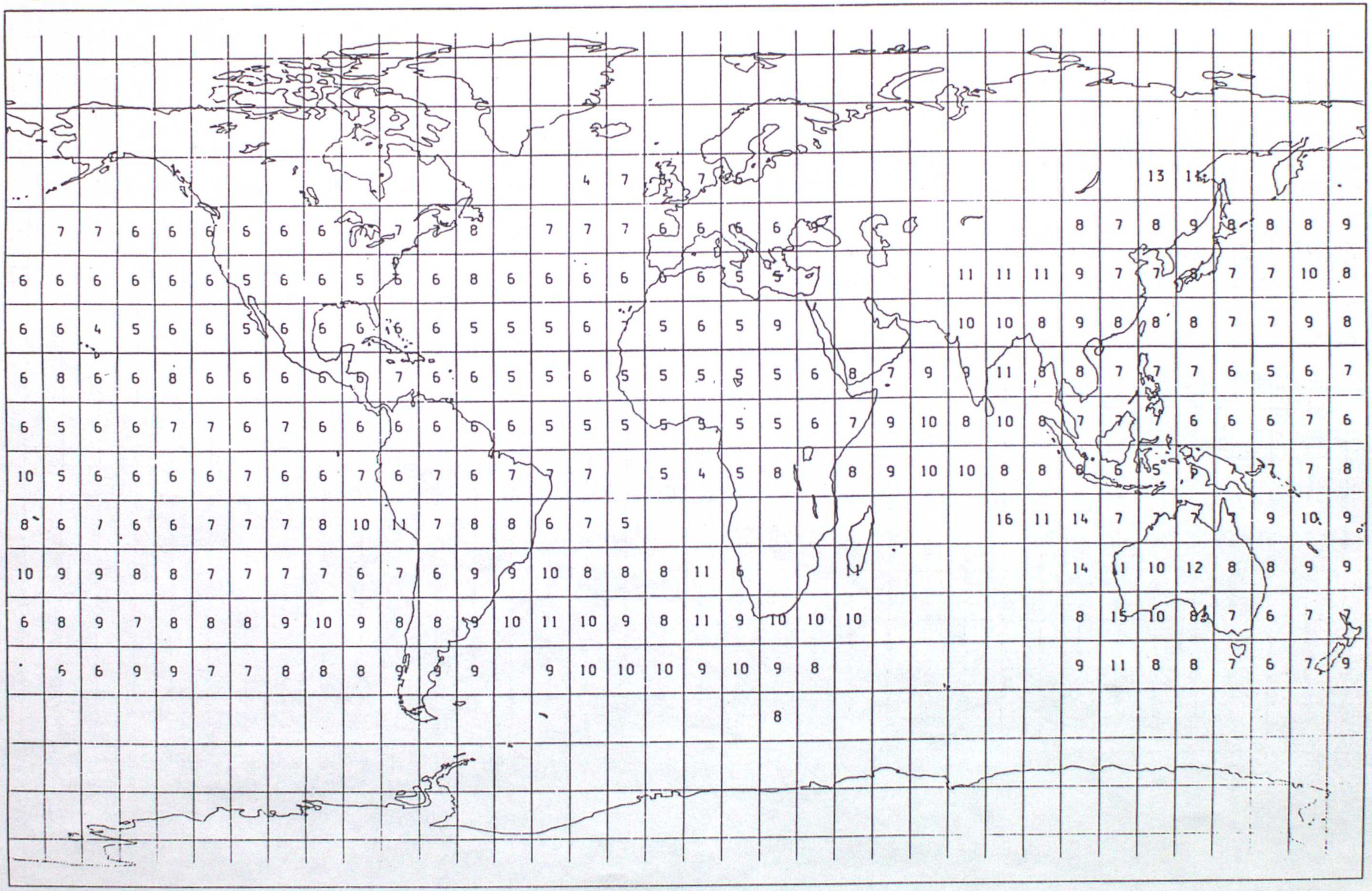
USING ALL OBSERVATIONS

VALUES ARE PRINTED WHERE > 10 OBS ARE PRESENT



0.0 -0.3 -0.3 -0.3
-8.7 -4.3
-1.3 -1.5 -1.6 -1.0 -1.6 -2.2 -2.7 -1.7 -3.7 -3.4 -3.0 -0.1 0.1 0.0 -0.1 -0.9 -0.6 -2.0 -2.5 2.5 -0.1 -0.2 0.2 0.9 0.9 -0.6 -1.4
0.3 0.1 -1.1 -0.3 0.7 1.5 -0.7 -1.9 -1.3 -1.8 -2.4 -0.8 -2.9 -1.1 0.5 0.0 -1.8 0.4 -0.5 0.8 0.3 1.2 -2.3 -1.4 2.1 1.6 1.0 1.2 1.2 1.3 -0.2 1.5
3.2 1.2 0.9 1.8 2.5 1.6 0.5 -0.5 1.2 0.1 -0.3 -1.0 -0.2 1.1 1.6 3.0 4.1 1.5 -1.6 -1.5 3.8 4.4 4.0 1.6 3.2 2.4 3.5 3.7 1.2 1.4 0.3 2.3
1.5 0.9 1.4 1.7 2.0 1.8 1.3 0.4 -0.5 -0.1 0.4 0.8 1.3 0.7 1.1 2.8 2.6 2.0 2.5 1.0 1.0 -0.6 0.6 1.8 2.5 3.0 3.6 1.2 1.2 2.5 1.8 1.6 1.5 0.8 0.0 0.0
1.4 -0.2 -0.1 0.7 -0.2 0.7 0.1 -0.1 -1.3 -0.7 0.2 0.7 -0.1 0.8 1.3 1.0 1.5 1.9 1.1 1.5 2.1 0.8 1.8 2.7 3.9 3.4 3.1 0.7 0.2 -1.6 -1.6 -0.8 -0.1 1.1 1.7 1.5
1.3 -0.1 -0.4 0.8 1.9 1.9 2.8 2.9 2.0 3.0 0.4 0.5 0.9 0.8 0.5 -0.5 3.4 1.0 0.6 2.1 2.9 2.2 4.0 2.8 2.3 1.0 2.5 0.7 -0.5 0.4 1.1 1.4 1.0 1.3
3.0 0.7 -0.6 -0.6 1.1 3.6 4.5 2.8 0.5 4.8 0.4 0.7 2.5 2.2 2.8 0.2 -1.8 4.7 3.0 3.5 0.0 1.2 1.6 3.0 1.7 2.0 3.0
0.2 -2.1 -3.6 -3.0 -1.3 -1.3 -1.7 -1.5 0.4 1.9 2.6 -0.9 -1.3 -0.8 -1.3 -1.0 -0.6 0.8 0.9 0.8 -3.9 -3.7 -1.6 -2.2 1.9 1.4 -0.9 -0.3 -0.4
3.8 0.9 1.7 -0.3 -1.1 -0.8 0.4 0.7 -1.1 -2.7 -3.3 -3.3 -4.1 -3.5 -4.5 -3.2 -2.1 -1.2 -2.1 0.0 -0.7 -1.5 -3.0 -0.8 2.7 4.2 -1.3 -1.9 0.1 -1.2 1.3
-2.4 -1.2 -0.7 -0.6 0.7 0.5 -2.1 -0.8 -1.9 -3.8 -8.0 -3.5 -2.0 -1.3 -1.7 -2.3 -1.8 -0.9 -0.9 -0.2 -0.8 0.2 -0.2 -0.2 -2.5 0.1 1.5 0.8
0.0

SATOBS : RMS O-B VECTOR DIFFERENCES (M/S) BETWEEN 101 AND 400 HPA FIGURE 22
JUNE 1993
USING ALL OBSERVATIONS
VALUES ARE PRINTED WHERE > 10 OBS ARE PRESENT


4 7 7 6 13 14
7 7 6 6 6 5 6 6 7 7 8 7 7 7 6 6 6 6 9 8 7 8 9 8 8 8 9
6 6 6 6 6 6 5 6 6 5 6 6 8 6 6 6 6 6 6 5 5 11 11 11 9 7 7 8 7 7 10 8
6 6 4 5 6 6 5 6 6 6 6 6 5 5 5 6 7 5 6 5 9 10 10 8 9 8 8 8 7 7 9 8
6 8 6 6 8 6 6 6 6 6 7 6 6 5 5 6 5 5 5 5 5 6 8 7 9 9 11 8 8 7 7 7 6 5 6 7
6 5 6 6 7 7 6 7 6 6 6 6 6 6 5 5 5 5 5 5 5 6 7 9 10 8 10 8 7 7 7 6 6 6 7 6
10 5 6 6 6 6 7 6 6 7 6 7 6 7 7 7 5 4 5 8 8 9 10 10 8 8 6 6 5 5 7 7 7 8
8 6 7 6 6 7 7 7 8 10 11 7 8 8 6 7 5 16 11 14 7 7 7 7 9 10 9
10 9 9 8 8 7 7 7 7 6 7 6 9 9 10 8 8 8 11 6 11 14 11 10 12 8 8 9 9
6 8 9 7 8 8 8 9 10 9 8 8 9 10 11 10 9 8 11 9 10 10 10 8 15 10 8 7 6 7 7
6 6 9 9 7 7 8 8 8 9 9 9 9 10 10 10 9 10 9 8 9 11 8 8 7 6 7 9
8

MONITORING OF SATELLITE TEMPERATURES

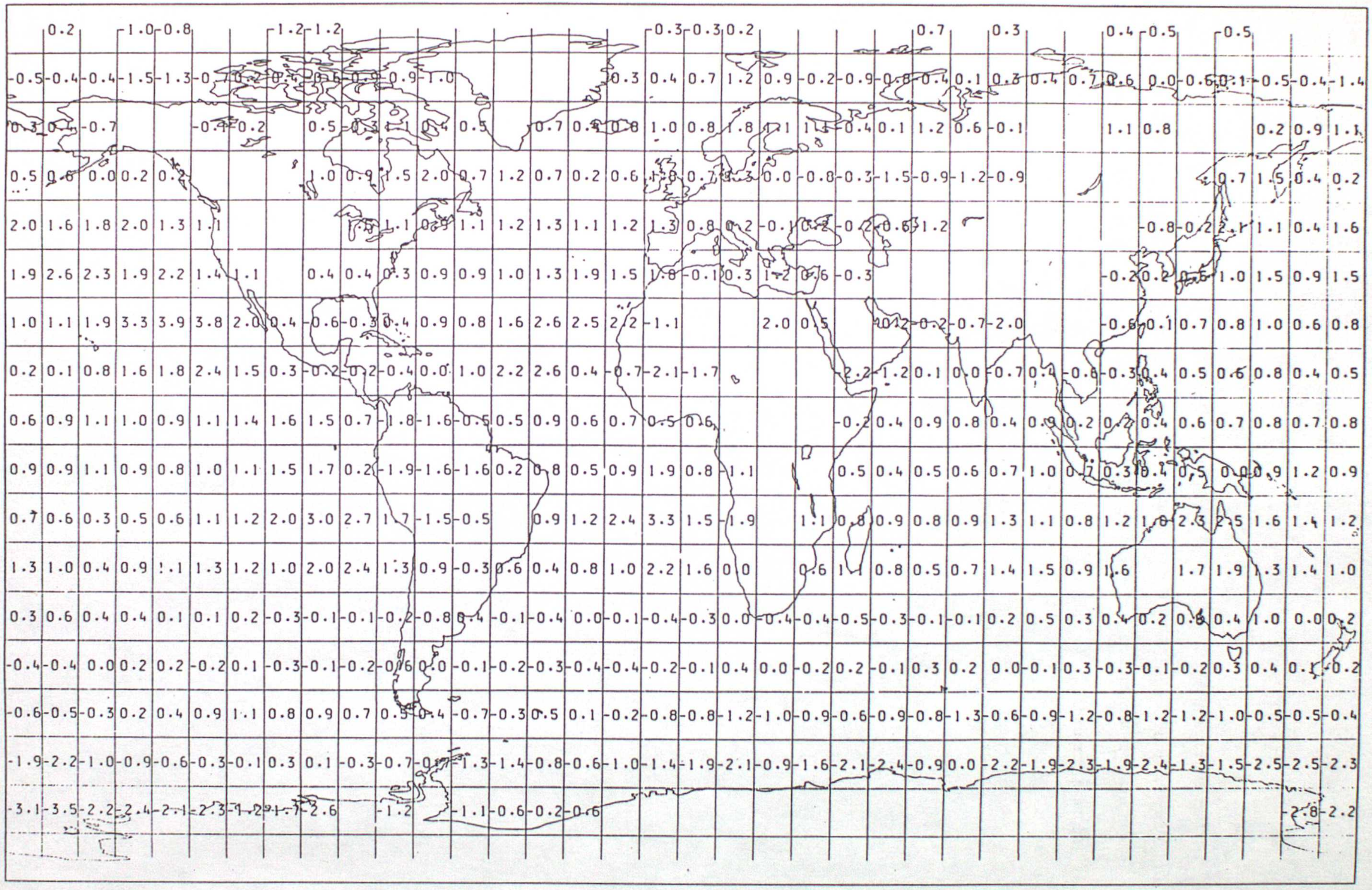
MONITORING CENTRE: BRACKNELL

MONTH: JUNE 1993

Monitoring procedures

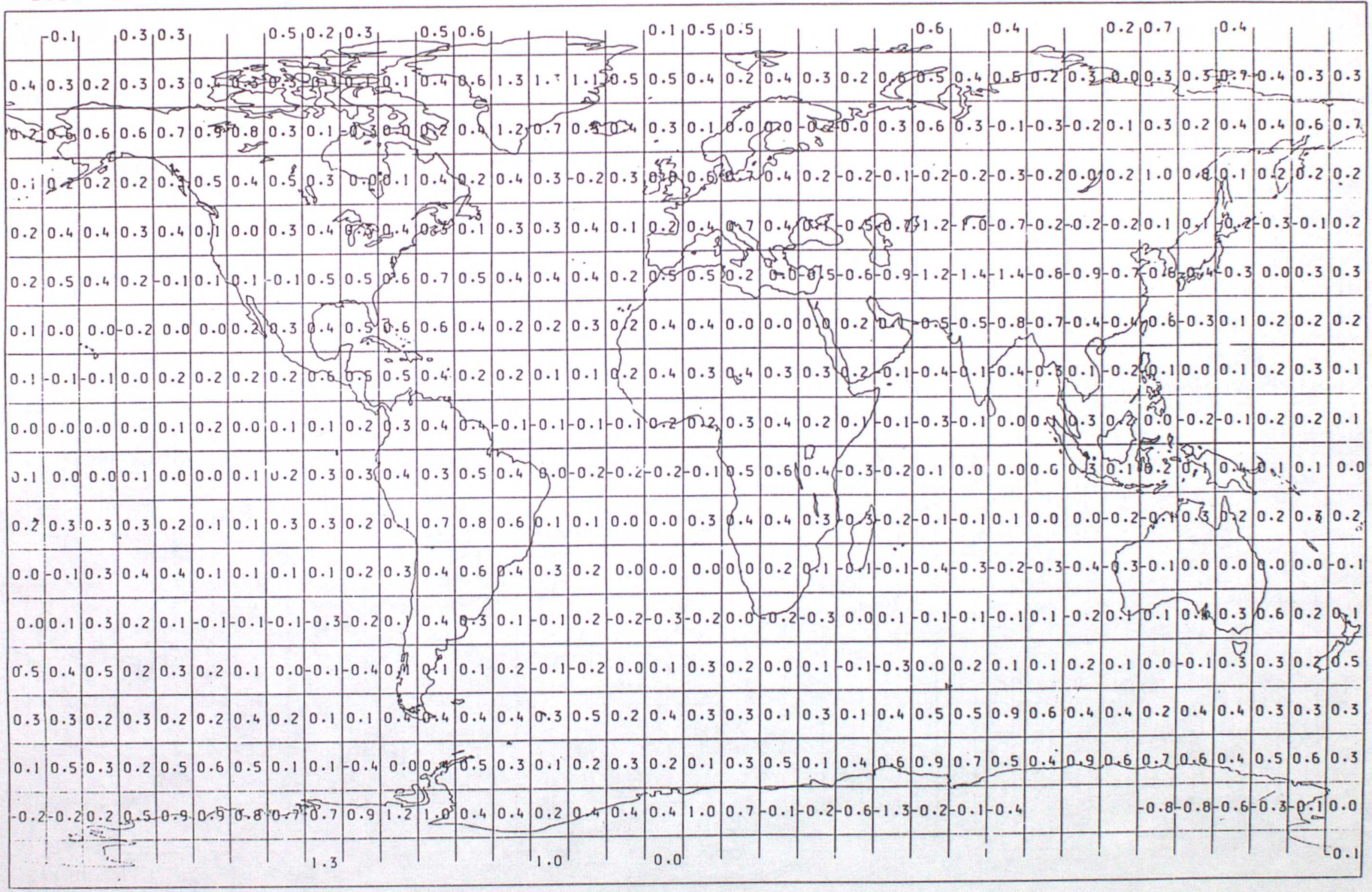
Period	:One calendar month.
Data monitored	:Reports from NOAA-11, NOAA-12 500 km.
Standard of comparison	:Background field from Bracknell global model.
Selection Criteria	:All SATEM soundings where number of observations > 30.
Data Extracted	:Layer: 850 - 1000 hPa 100 - 300 hPa 30 - 50 hPa
	:Mean observation minus background temperature differences

500 KM SATEMS : MEAN O-B TEMPERATURE DIFFERENCES (DEG C) : 850 TO 1000 HPA
JUNE 1993 FIGURE 23
NOAA-11, USING ALL OBSERVATIONS
VALUES ARE PRINTED WHERE > 30 OBS ARE PRESENT


0.2 -1.0 -0.8 -1.2 -1.2 -0.3 -0.3 0.2 0.7 0.3 0.4 -0.5 -0.5
-0.5 -0.4 -0.4 -1.5 -1.3 -0.7 -0.9 -1.0 0.3 0.4 0.7 1.2 0.9 -0.2 -0.9 -0.8 -0.4 0.1 0.3 0.4 0.7 0.6 0.0 -0.6 0.1 -0.5 -0.4 -1.4
-0.7 -0.4 0.2 0.5 0.4 0.5 0.7 0.8 1.0 0.8 1.8 -0.4 0.1 1.2 0.6 -0.1 1.1 0.8 0.2 0.9 1.1
0.5 0.6 0.0 0.2 0.2 1.0 0.9 1.5 2.0 0.7 1.2 0.7 0.2 0.6 1.0 0.7 0.0 -0.8 -0.3 -1.5 -0.9 -1.2 -0.9 0.7 1.5 0.4 0.2
2.0 1.6 1.8 2.0 1.3 1.1 1.1 1.1 1.2 1.3 1.1 1.2 1.3 0.8 0.2 -0.1 -0.2 -0.6 1.2 -0.8 -0.2 2.1 1.1 0.4 1.6
1.9 2.6 2.3 1.9 2.2 1.4 1.1 0.4 0.4 0.3 0.9 0.9 1.0 1.3 1.9 1.5 1.0 -0.1 0.3 1.2 0.6 -0.3 -0.2 0.2 0.5 1.0 1.5 0.9 1.5
1.0 1.1 1.9 3.3 3.9 3.8 2.0 0.4 -0.6 -0.3 0.4 0.9 0.8 1.6 2.6 2.5 2.2 -1.1 2.0 0.5 0.2 -0.2 -0.7 -2.0 -0.6 0.1 0.7 0.8 1.0 0.6 0.8
0.2 0.1 0.8 1.6 1.8 2.4 1.5 0.3 -0.2 0.2 -0.4 0.0 1.0 2.2 2.6 0.4 -0.7 -2.1 -1.7 2.2 -1.2 0.1 0.0 -0.7 0.4 -0.6 -0.3 0.4 0.5 0.6 0.8 0.4 0.5
0.6 0.9 1.1 1.0 0.9 1.1 1.4 1.6 1.5 0.7 -1.8 -1.6 -0.5 0.5 0.9 0.6 0.7 0.5 0.6 -0.2 0.4 0.9 0.8 0.4 0.9 0.2 0.2 0.4 0.6 0.7 0.8 0.7 0.8
0.9 0.9 1.1 0.9 0.8 1.0 1.1 1.5 1.7 0.2 -1.9 -1.6 -1.6 0.2 0.8 0.5 0.9 1.9 0.8 1.1 0.5 0.4 0.5 0.6 0.7 1.0 0.7 0.3 0.4 0.5 0.0 0.9 1.2 0.9
0.7 0.6 0.3 0.5 0.6 1.1 1.2 2.0 3.0 2.7 1.7 -1.5 -0.5 0.9 1.2 2.4 3.3 1.5 1.9 1.1 0.8 0.9 0.8 0.9 1.3 1.1 0.8 1.2 1.0 2.3 2.5 1.6 1.4 1.2
1.3 1.0 0.4 0.9 1.1 1.3 1.2 1.0 2.0 2.4 1.3 0.9 -0.3 0.6 0.4 0.8 1.0 2.2 1.6 0.0 0.6 1.1 0.8 0.5 0.7 1.4 1.5 0.9 1.6 1.7 1.9 1.3 1.4 1.0
0.3 0.6 0.4 0.4 0.1 0.1 0.2 -0.3 -0.1 -0.1 -0.2 -0.8 0.4 -0.1 -0.4 0.0 -0.1 -0.4 -0.3 0.0 -0.4 -0.4 -0.5 -0.3 -0.1 -0.1 0.2 0.5 0.3 0.4 0.2 0.6 0.4 1.0 0.0 0.2
-0.4 -0.4 0.0 0.2 0.2 -0.2 0.1 -0.3 -0.1 -0.2 -0.6 0.0 -0.1 -0.2 -0.3 -0.4 -0.4 -0.2 -0.1 0.4 0.0 -0.2 0.2 -0.1 0.3 0.2 0.0 -0.1 0.3 -0.3 -0.1 -0.2 0.3 0.4 0.1 -0.2
-0.6 -0.5 -0.3 0.2 0.4 0.9 1.1 0.8 0.9 0.7 0.5 0.4 -0.7 -0.3 0.5 0.1 -0.2 -0.8 -0.8 -1.2 -1.0 -0.9 -0.6 -0.9 -0.8 -1.3 -0.6 -0.9 -1.2 -0.8 -1.2 -1.2 -1.0 -0.5 -0.5 -0.4
-1.9 -2.2 -1.0 -0.9 -0.6 -0.3 -0.1 0.3 0.1 -0.3 -0.7 -0.7 -1.3 -1.4 -0.8 -0.6 -1.0 -1.4 -1.9 -2.1 -0.9 -1.6 -2.1 -2.4 -0.9 0.0 -2.2 -1.9 -2.3 -1.9 -2.4 -1.3 -1.5 -2.5 -2.5 -2.3
-3.1 -3.5 -2.2 -2.4 -2.1 -2.3 -1.2 -1.7 -2.6 -1.2 -1.1 -0.6 -0.2 -0.6 -2.8 -2.2

500 KM SATEMS : MEAN O-B TEMPERATURE DIFFERENCES (DEG C) : 100 TO 300 HPA
JUNE 1993
NOAA-11. USING ALL OBSERVATIONS
VALUES ARE PRINTED WHERE > 30 OBS ARE PRESENT

FIGURE 24

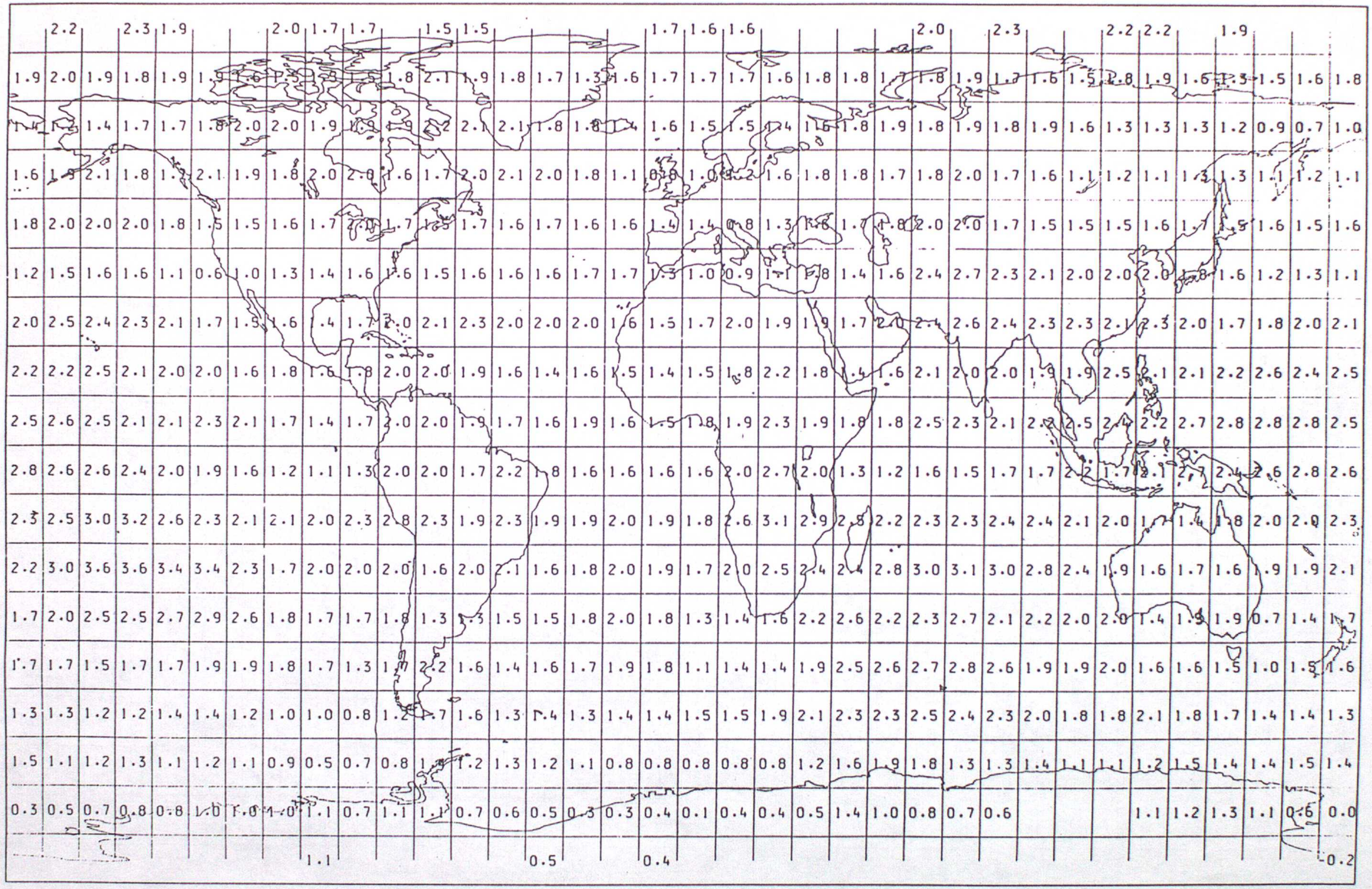

-0.1 0.3 0.3 0.5 0.2 0.3 0.5 0.6 0.1 0.5 0.5 0.6 0.4 0.2 0.7 0.4
0.4 0.3 0.2 0.3 0.3 0.4 0.3 0.3 0.1 0.1 0.1 0.4 0.6 1.3 1.3 1.1 0.5 0.5 0.4 0.2 0.4 0.3 0.2 0.6 0.5 0.4 0.5 0.2 0.3 0.0 0.3 0.3 0.7 -0.4 0.3 0.3
0.2 0.6 0.6 0.6 0.7 0.9 0.8 0.3 0.1 -0.3 0.0 0.2 0.4 1.2 0.7 0.5 0.4 0.3 0.1 0.0 0.0 -0.2 0.0 0.3 0.6 0.3 -0.1 -0.3 -0.2 0.1 0.3 0.2 0.4 0.4 0.6 0.7
0.1 0.2 0.2 0.2 0.3 0.5 0.4 0.5 0.3 0.0 0.1 0.4 0.2 0.4 0.3 -0.2 0.3 0.0 0.6 0.7 0.4 0.2 -0.2 -0.1 -0.2 -0.2 -0.3 -0.2 0.0 0.2 1.0 0.8 0.1 0.2 0.2 0.2
0.2 0.4 0.4 0.3 0.4 0.1 0.0 0.3 0.4 0.3 0.4 0.3 0.1 0.3 0.3 0.4 0.1 0.2 0.4 0.7 0.4 0.1 -0.5 -0.7 -1.2 -1.0 -0.7 -0.2 -0.2 -0.2 0.1 0.1 -0.2 -0.3 -0.1 0.2
0.2 0.5 0.4 0.2 -0.1 0.1 0.1 -0.1 0.5 0.5 0.6 0.7 0.5 0.4 0.4 0.4 0.2 0.5 0.5 0.2 0.0 -0.5 -0.6 -0.9 -1.2 -1.4 -1.4 -0.6 -0.9 -0.7 -0.6 -0.4 -0.3 0.0 0.3 0.3
0.1 0.0 0.0 -0.2 0.0 0.0 0.2 0.3 0.4 0.5 0.6 0.6 0.4 0.2 0.2 0.3 0.2 0.4 0.4 0.0 0.0 0.0 0.2 0.1 -0.5 -0.5 -0.8 -0.7 -0.4 -0.4 0.6 -0.3 0.1 0.2 0.2 0.2
0.1 -0.1 -0.1 0.0 0.2 0.2 0.2 0.2 0.6 0.5 0.5 0.4 0.2 0.2 0.1 0.1 0.2 0.4 0.3 0.4 0.3 0.3 0.2 -0.1 -0.4 -0.1 -0.4 -0.3 0.1 -0.2 0.1 0.0 0.1 0.2 0.3 0.1
0.0 0.0 0.0 0.0 0.1 0.2 0.0 0.1 0.1 0.2 0.3 0.4 0.4 -0.1 -0.1 -0.1 -0.1 0.2 0.2 0.3 0.4 0.2 0.1 -0.1 -0.3 -0.1 0.0 0.0 0.3 0.2 0.0 -0.2 -0.1 0.2 0.2 0.1
0.1 0.0 0.0 0.1 0.0 0.0 0.1 0.2 0.3 0.3 0.4 0.3 0.5 0.4 0.0 -0.2 -0.2 -0.2 -0.1 0.5 0.6 0.4 -0.3 -0.2 0.1 0.0 0.0 0.0 0.3 0.1 0.2 0.1 0.4 0.1 0.1 0.0
0.2 0.3 0.3 0.3 0.2 0.1 0.1 0.3 0.3 0.2 0.1 0.7 0.8 0.6 0.1 0.1 0.0 0.0 0.3 0.4 0.4 0.3 -0.3 -0.2 -0.1 -0.1 0.1 0.0 0.0 -0.2 -0.1 0.3 0.2 0.2 0.7 0.2
0.0 -0.1 0.3 0.4 0.4 0.1 0.1 0.1 0.1 0.2 0.3 0.4 0.6 0.4 0.3 0.2 0.0 0.0 0.0 0.0 0.2 0.1 -0.1 -0.1 -0.4 -0.3 -0.2 -0.3 -0.4 -0.3 -0.1 0.0 0.0 0.0 0.0 -0.1
0.0 0.1 0.3 0.2 0.1 -0.1 -0.1 -0.1 -0.3 -0.2 0.1 0.4 0.3 0.1 -0.1 0.2 -0.2 -0.3 -0.2 0.0 -0.2 -0.3 0.0 0.1 -0.1 -0.1 -0.1 0.1 -0.2 0.1 0.1 0.4 0.3 0.6 0.2 0.1
0.5 0.4 0.5 0.2 0.3 0.2 0.1 0.0 -0.1 -0.4 0.1 0.1 0.1 0.2 -0.1 -0.2 0.0 0.1 0.3 0.2 0.0 0.1 -0.1 -0.3 0.0 0.2 0.1 0.1 0.2 0.1 0.0 -0.1 0.3 0.3 0.2 0.5
0.3 0.3 0.2 0.3 0.2 0.2 0.4 0.2 0.1 0.1 0.4 0.4 0.4 0.4 0.3 0.5 0.2 0.4 0.3 0.3 0.1 0.3 0.1 0.4 0.5 0.5 0.9 0.6 0.4 0.4 0.2 0.4 0.4 0.3 0.3 0.3
0.1 0.5 0.3 0.2 0.5 0.6 0.5 0.1 0.1 -0.4 0.0 0.4 0.5 0.3 0.1 0.2 0.3 0.2 0.1 0.3 0.5 0.1 0.4 0.6 0.9 0.7 0.5 0.4 0.9 0.6 0.7 0.6 0.4 0.5 0.6 0.3
-0.2 -0.2 0.2 0.5 -0.9 0.9 0.8 -0.7 0.7 0.9 1.2 1.0 0.4 0.4 0.2 0.4 0.4 0.4 1.0 0.7 -0.1 -0.2 -0.6 -1.3 -0.2 -0.1 -0.4 -0.8 -0.8 -0.6 -0.3 -0.1 0.0
1.3 1.0 0.0 -0.1

500 KM SATEMS : MEAN O-B TEMPERATURE DIFFERENCES (DEG C) : 30 TO 50 HPA

JUNE 1993 FIGURE 25

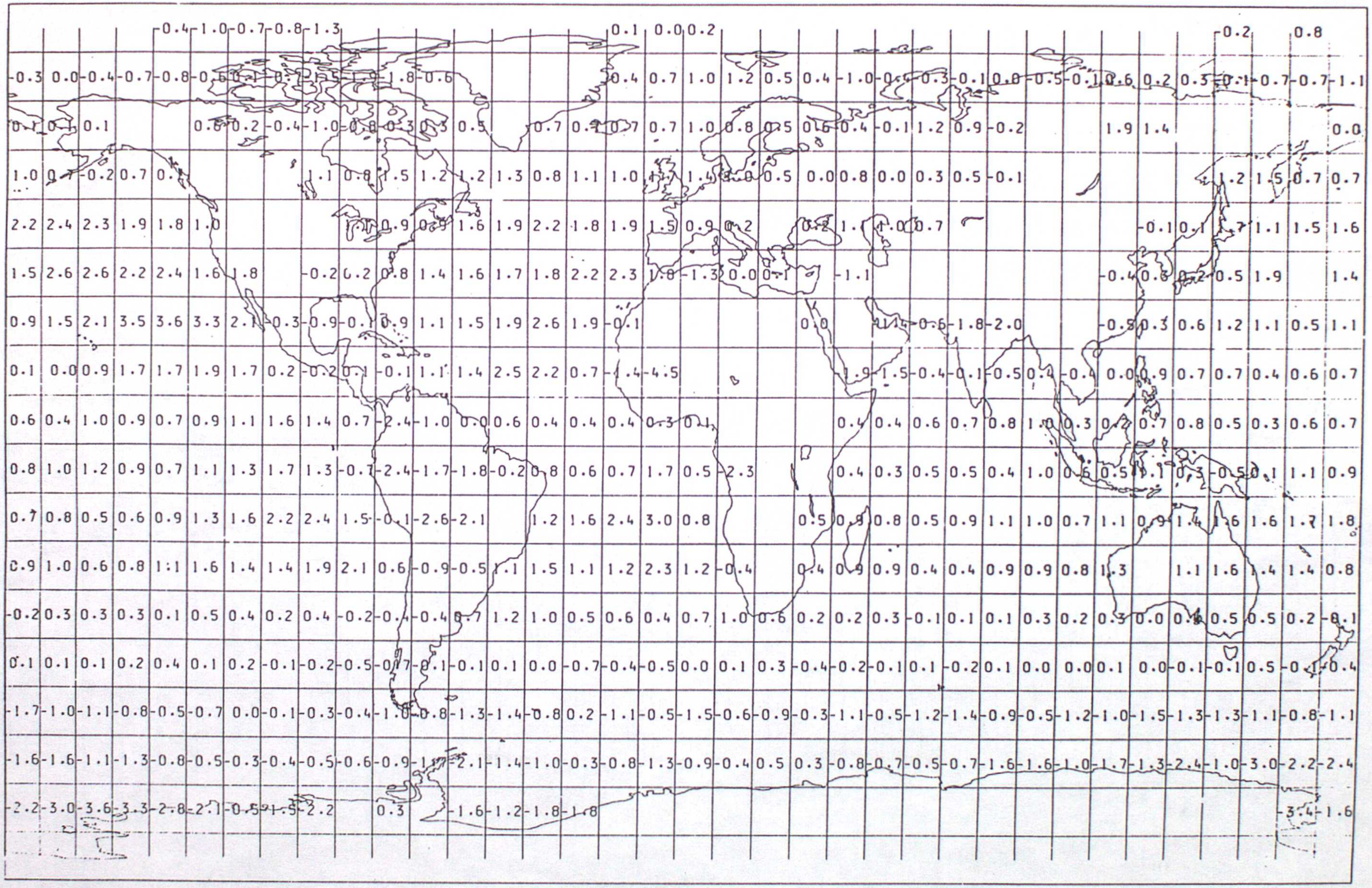
NOAA-11, USING ALL OBSERVATIONS

VALUES ARE PRINTED WHERE > 30 OBS ARE PRESENT



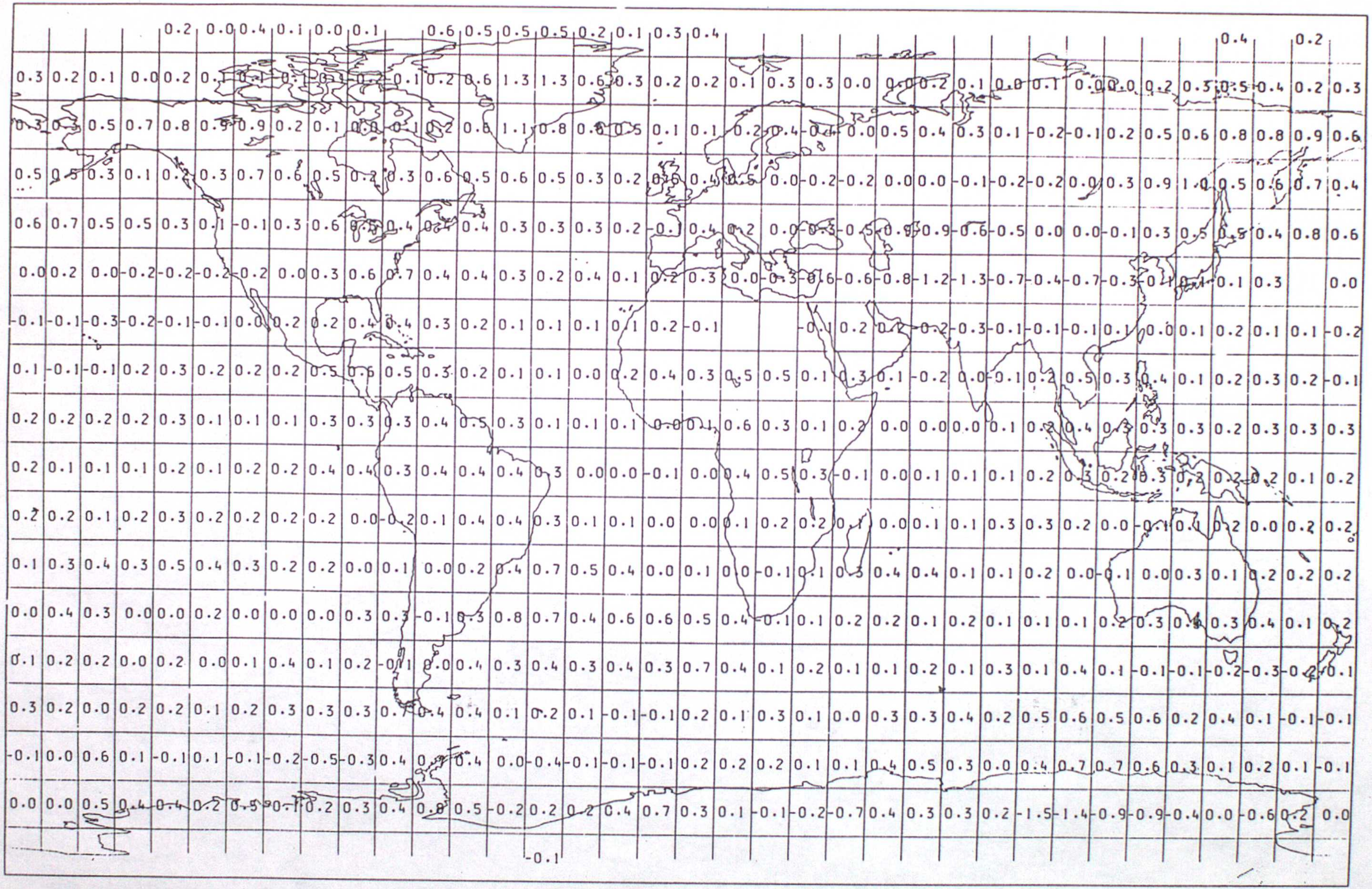
	2.2		2.3	1.9			2.0	1.7	1.7		1.5	1.5					1.7	1.6	1.6					2.0		2.3			2.2	2.2		1.9			
1.9	2.0	1.9	1.8	1.9	1.9	1.6	1.5	1.8	1.5	1.8	2.1	1.9	1.8	1.7	1.3	1.6	1.7	1.7	1.7	1.6	1.8	1.8	1.7	1.8	1.9	1.7	1.6	1.5	1.8	1.9	1.6	1.3	1.5	1.6	1.8
1.4	1.2	1.4	1.7	1.7	1.8	2.0	2.0	1.9	1.9	1.9	2.2	2.1	2.1	1.8	1.8	1.4	1.6	1.5	1.5	1.4	1.6	1.8	1.9	1.8	1.9	1.8	1.9	1.6	1.3	1.3	1.3	1.2	0.9	0.7	1.0
1.6	1.9	2.1	1.8	1.7	2.1	1.9	1.8	2.0	2.0	1.6	1.7	2.0	2.1	2.0	1.8	1.1	0.8	1.0	1.2	1.6	1.8	1.8	1.7	1.8	2.0	1.7	1.6	1.1	1.2	1.1	1.3	1.3	1.1	1.2	1.1
1.8	2.0	2.0	2.0	1.8	1.5	1.5	1.6	1.7	2.0	1.7	1.5	1.7	1.6	1.7	1.6	1.6	1.4	1.4	0.8	1.3	1.6	1.7	1.8	2.0	2.0	1.7	1.5	1.5	1.5	1.6	1.7	1.5	1.6	1.5	1.6
1.2	1.5	1.6	1.6	1.1	0.6	1.0	1.3	1.4	1.6	1.6	1.5	1.6	1.6	1.6	1.7	1.7	1.3	1.0	0.9	1.1	1.8	1.4	1.6	2.4	2.7	2.3	2.1	2.0	2.0	2.0	1.8	1.6	1.2	1.3	1.1
2.0	2.5	2.4	2.3	2.1	1.7	1.5	1.6	1.4	1.7	2.0	2.1	2.3	2.0	2.0	2.0	1.6	1.5	1.7	2.0	1.9	1.9	1.7	2.0	2.4	2.6	2.4	2.3	2.3	2.1	2.3	2.0	1.7	1.8	2.0	2.1
2.2	2.2	2.5	2.1	2.0	2.0	1.6	1.8	1.6	1.8	2.0	2.0	1.9	1.6	1.4	1.6	1.5	1.4	1.5	1.8	2.2	1.8	1.4	1.6	2.1	2.0	2.0	1.9	1.9	2.5	2.1	2.1	2.2	2.6	2.4	2.5
2.5	2.6	2.5	2.1	2.1	2.3	2.1	1.7	1.4	1.7	2.0	2.0	1.9	1.7	1.6	1.9	1.6	1.5	1.8	1.9	2.3	1.9	1.8	1.8	2.5	2.3	2.1	2.2	2.5	2.4	2.2	2.7	2.8	2.8	2.8	2.5
2.8	2.6	2.6	2.4	2.0	1.9	1.6	1.2	1.1	1.3	2.0	2.0	1.7	2.2	1.8	1.6	1.6	1.6	1.6	2.0	2.7	2.0	1.3	1.2	1.6	1.5	1.7	1.7	2.2	1.7	2.1	2.7	2.4	2.6	2.8	2.6
2.3	2.5	3.0	3.2	2.6	2.3	2.1	2.1	2.0	2.3	2.8	2.3	1.9	2.3	1.9	1.9	2.0	1.9	1.8	2.6	3.1	2.9	2.5	2.2	2.3	2.3	2.4	2.4	2.1	2.0	1.7	1.4	1.8	2.0	2.0	2.3
2.2	3.0	3.6	3.6	3.4	3.4	2.3	1.7	2.0	2.0	2.0	1.6	2.0	2.1	1.6	1.8	2.0	1.9	1.7	2.0	2.5	2.4	2.4	2.8	3.0	3.1	3.0	2.8	2.4	1.9	1.6	1.7	1.6	1.9	1.9	2.1
1.7	2.0	2.5	2.5	2.7	2.9	2.6	1.8	1.7	1.7	1.8	1.3	1.3	1.5	1.5	1.8	2.0	1.8	1.3	1.4	1.6	2.2	2.6	2.2	2.3	2.7	2.1	2.2	2.0	2.0	1.4	1.9	1.9	0.7	1.4	1.7
1.7	1.7	1.5	1.7	1.7	1.9	1.9	1.8	1.7	1.3	1.7	2.2	1.6	1.4	1.6	1.7	1.9	1.8	1.1	1.4	1.4	1.9	2.5	2.6	2.7	2.8	2.6	1.9	1.9	2.0	1.6	1.6	1.5	1.0	1.5	1.6
1.3	1.3	1.2	1.2	1.4	1.4	1.2	1.0	1.0	0.8	1.2	1.7	1.6	1.3	1.4	1.3	1.4	1.4	1.5	1.5	1.9	2.1	2.3	2.3	2.5	2.4	2.3	2.0	1.8	1.8	2.1	1.8	1.7	1.4	1.4	1.3
1.5	1.1	1.2	1.3	1.1	1.2	1.1	0.9	0.5	0.7	0.8	[illegible]	1.2	1.3	1.2	1.1	0.8	0.8	0.8	0.8	0.8	1.2	1.6	1.9	1.8	1.3	1.3	1.4	1.1	1.1	1.2	1.5	1.4	1.4	1.5	1.4
0.3	0.5	0.7	0.8	0.8	1.0	1.0	1.0	1.1	0.7	1.1	1.1	0.7	0.6	0.5	0.3	0.3	0.4	0.1	0.4	0.4	0.5	1.4	1.0	0.8	0.7	0.6				1.1	1.2	1.3	1.1	0.6	0.0
								1.1						0.5			0.4																		0.2

500 KM SATEMS : MEAN O-B TEMPERATURE DIFFERENCES (DEG C) : 850 TO 1000 HPA
JUNE 1993
FIGURE 26
NOAA-12. USING ALL OBSERVATIONS
VALUES ARE PRINTED WHERE > 30 OBS ARE PRESENT

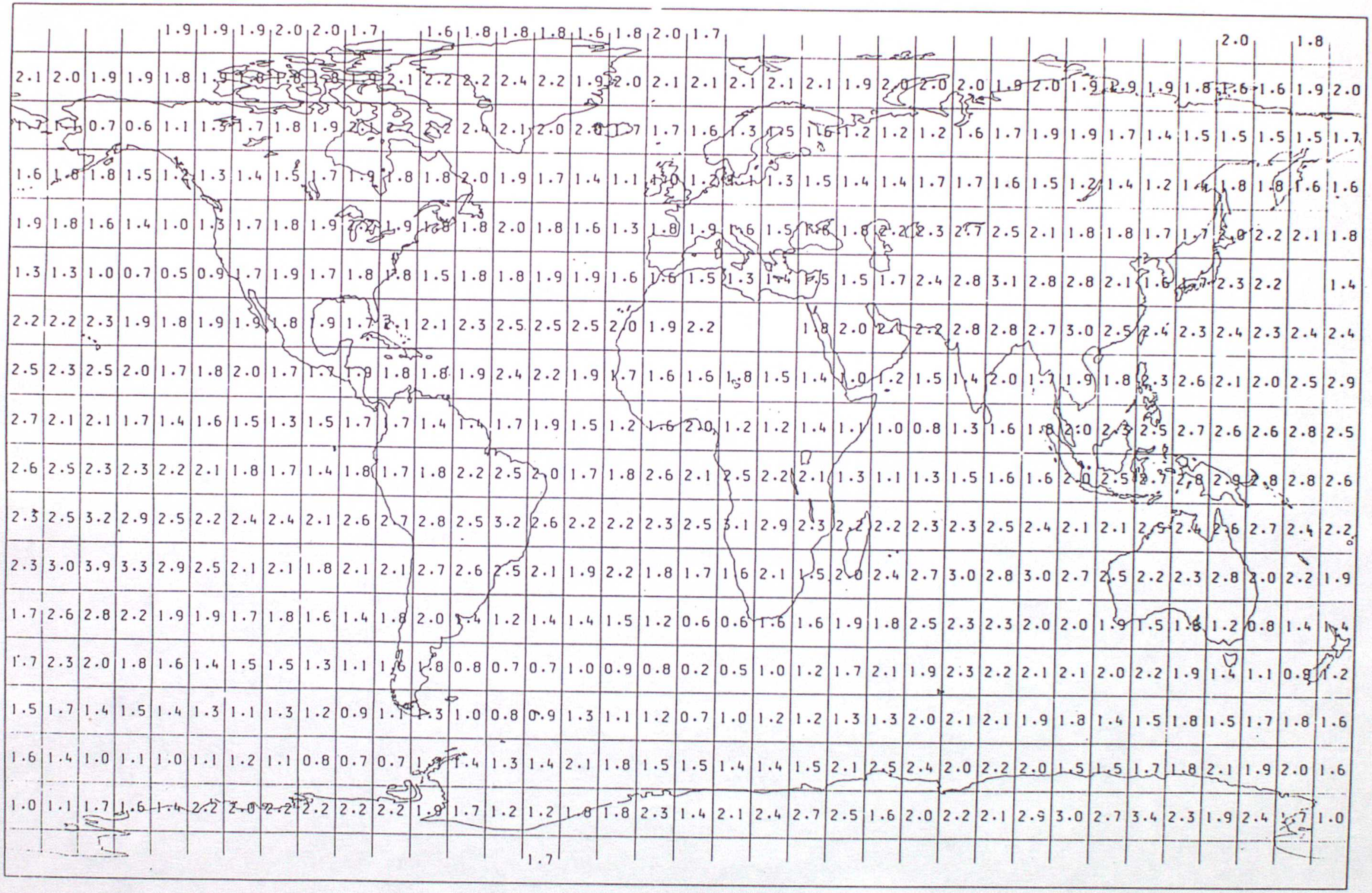

-0.4 -1.0 -0.7 -0.8 -1.3 0.1 0.0 0.2 -0.2 0.8
-0.3 0.0 -0.4 -0.7 -0.8 -0.6 1.8 -0.6 0.4 0.7 1.0 1.2 0.5 0.4 -1.0 -0.4 -0.3 -0.1 0.0 -0.5 -0.1 0.6 0.2 0.3 -0.1 -0.7 -0.7 -1.1
-0.1 -0.1 0.1 0.6 0.2 -0.4 -1.0 -0.8 -0.3 0.3 0.5 0.7 0.7 0.7 0.7 1.0 0.8 0.5 0.6 -0.4 -0.1 1.2 0.9 -0.2 1.9 1.4 0.0
1.0 0.7 -0.2 0.7 0.1 1.1 0.8 1.5 1.2 1.2 1.3 0.8 1.1 1.0 1.7 1.4 0.0 0.5 0.0 0.8 0.0 0.3 0.5 -0.1 1.2 1.5 0.7 0.7
2.2 2.4 2.3 1.9 1.8 1.0 1.1 0.9 0.9 1.6 1.9 2.2 1.8 1.9 1.5 0.9 0.2 0.2 1.1 1.0 0.7 -0.1 0.1 1.7 1.1 1.5 1.6
1.5 2.6 2.6 2.2 2.4 1.6 1.8 -0.2 0.2 0.8 1.4 1.6 1.7 1.8 2.2 2.3 1.8 -1.3 0.0 0.1 -1.1 -0.4 0.0 0.2 -0.5 1.9 1.4
0.9 1.5 2.1 3.5 3.6 3.3 2.1 -0.3 -0.9 -0.1 0.9 1.1 1.5 1.9 2.6 1.9 -0.1 0.0 1.4 -0.6 -1.8 -2.0 -0.5 0.3 0.6 1.2 1.1 0.5 1.1
0.1 0.0 0.9 1.7 1.7 1.9 1.7 0.2 -0.2 0.1 -0.1 1.1 1.4 2.5 2.2 0.7 -1.4 -4.5 1.9 1.5 -0.4 -0.1 -0.5 0.4 -0.4 0.0 0.9 0.7 0.7 0.4 0.6 0.7
0.6 0.4 1.0 0.9 0.7 0.9 1.1 1.6 1.4 0.7 -2.4 -1.0 0.0 0.6 0.4 0.4 0.4 -0.3 0.1 0.4 0.4 0.6 0.7 0.8 1.0 0.3 0.2 0.7 0.8 0.5 0.3 0.6 0.7
0.8 1.0 1.2 0.9 0.7 1.1 1.3 1.7 1.3 -0.7 -2.4 -1.7 -1.8 -0.2 0.8 0.6 0.7 1.7 0.5 -2.3 0.4 0.3 0.5 0.5 0.4 1.0 0.6 0.5 0.1 0.3 -0.5 0.1 1.1 0.9
0.7 0.8 0.5 0.6 0.9 1.3 1.6 2.2 2.4 1.5 -0.1 -2.6 -2.1 1.2 1.6 2.4 3.0 0.8 0.5 0.9 0.8 0.5 0.9 1.1 1.0 0.7 1.1 0.9 1.4 1.6 1.6 1.7 1.8
0.9 1.0 0.6 0.8 1.1 1.6 1.4 1.4 1.9 2.1 0.6 -0.9 -0.5 1.1 1.5 1.1 1.2 2.3 1.2 -0.4 0.4 0.9 0.9 0.4 0.4 0.9 0.9 0.8 1.3 1.1 1.6 1.4 1.4 0.8
-0.2 0.3 0.3 0.3 0.1 0.5 0.4 0.2 0.4 -0.2 -0.4 -0.4 0.7 1.2 1.0 0.5 0.6 0.4 0.7 1.0 0.6 0.2 0.2 0.3 -0.1 0.1 0.1 0.3 0.2 0.3 0.0 0.4 0.5 0.5 0.2 -0.1
0.1 0.1 0.1 0.2 0.4 0.1 0.2 -0.1 -0.2 -0.5 -0.7 -0.1 -0.1 0.1 0.0 -0.7 -0.4 -0.5 0.0 0.1 0.3 -0.4 -0.2 -0.1 0.1 -0.2 0.1 0.0 0.0 0.1 0.0 -0.1 -0.1 0.5 -0.1 -0.4
-1.7 -1.0 -1.1 -0.8 -0.5 -0.7 0.0 -0.1 -0.3 -0.4 -1.0 -0.8 -1.3 -1.4 -0.8 0.2 -1.1 -0.5 -1.5 -0.6 -0.9 -0.3 -1.1 -0.5 -1.2 -1.4 -0.9 -0.5 -1.2 -1.0 -1.5 -1.3 -1.3 -1.1 -0.8 -1.1
-1.6 -1.6 -1.1 -1.3 -0.8 -0.5 -0.3 -0.4 -0.5 -0.6 -0.9 -1.7 -2.1 -1.4 -1.0 -0.3 -0.8 -1.3 -0.9 -0.4 0.5 0.3 -0.8 -0.7 -0.5 -0.7 -1.6 -1.6 -1.0 -1.7 -1.3 -2.4 -1.0 -3.0 -2.2 -2.4
-2.2 -3.0 -3.6 -3.3 -2.8 -2.1 -0.5 -1.5 -2.2 0.3 -1.6 -1.2 -1.8 -1.8 -3.4 -1.6

500 KM SATEMS : MEAN O-B TEMPERATURE DIFFERENCES (DEG C) : 100 TO 300 HPA
JUNE 1993
NOAA-12. USING ALL OBSERVATIONS
VALUES ARE PRINTED WHERE > 30 OBS ARE PRESENT

FIGURE 27


0.2 0.0 0.0.4 0.1 0.0 0.0 0.1 0.6 0.5 0.5 0.5 0.2 0.1 0.3 0.4 0.4 0.2
0.3 0.2 0.1 0.0 0.2 0.1 0.1 0.1 0.1 0.2 0.1 0.2 0.6 1.3 1.3 0.6 0.3 0.2 0.2 0.1 0.3 0.3 0.0 0.0 0.2 0.1 0.0 0.1 0.0 0.0 0.2 0.3 0.5 -0.4 0.2 0.3
0.3 0.3 0.5 0.7 0.8 0.9 0.9 0.2 0.1 0.0 -0.1 0.2 0.6 1.1 0.8 0.8 0.5 0.1 0.1 -0.2 -0.4 -0.4 0.0 0.5 0.4 0.3 0.1 -0.2 -0.1 0.2 0.5 0.6 0.8 0.8 0.9 0.6
0.5 0.5 0.3 0.1 0.2 0.3 0.7 0.6 0.5 0.2 0.3 0.6 0.5 0.6 0.5 0.3 0.2 0.6 0.4 0.5 0.0 -0.2 -0.2 0.0 0.0 -0.1 -0.2 -0.2 0.0 0.3 0.9 1.0 0.5 0.6 0.7 0.4
0.6 0.7 0.5 0.5 0.3 0.1 -0.1 0.3 0.6 0.5 0.4 0.4 0.4 0.3 0.3 0.3 0.2 -0.1 0.4 0.2 0.0 -0.3 -0.5 -0.9 -0.9 -0.6 -0.5 0.0 0.0 -0.1 0.3 0.5 0.5 0.4 0.8 0.6
0.0 0.2 0.0 -0.2 -0.2 -0.2 -0.2 0.0 0.3 0.6 0.7 0.4 0.4 0.3 0.2 0.4 0.1 0.2 0.3 0.0 -0.3 -0.6 -0.6 -0.8 -1.2 -1.3 -0.7 -0.4 -0.7 -0.3 -0.1 -0.1 -0.1 0.3 0.0
-0.1 -0.1 -0.3 -0.2 -0.1 -0.1 0.0 0.2 0.2 0.4 0.4 0.3 0.2 0.1 0.1 0.1 0.1 0.2 -0.1 -0.1 0.2 0.2 -0.2 -0.3 -0.1 -0.1 -0.1 0.1 0.0 0.1 0.2 0.1 0.1 -0.2
0.1 -0.1 -0.1 0.2 0.3 0.2 0.2 0.2 0.5 0.6 0.5 0.3 0.2 0.1 0.1 0.0 0.2 0.4 0.3 0.5 0.5 0.1 0.3 0.1 -0.2 0.0 -0.1 0.2 0.5 0.3 0.4 0.1 0.2 0.3 0.2 -0.1
0.2 0.2 0.2 0.2 0.3 0.1 0.1 0.1 0.3 0.3 0.3 0.4 0.5 0.3 0.1 0.1 0.1 0.0 0.1 0.6 0.3 0.1 0.2 0.0 0.0 0.0 0.1 0.2 0.4 0.3 0.3 0.3 0.2 0.3 0.3 0.3
0.2 0.1 0.1 0.1 0.2 0.1 0.2 0.2 0.4 0.4 0.3 0.4 0.4 0.4 0.3 0.0 0.0 -0.1 0.0 0.4 0.5 0.3 -0.1 0.0 0.1 0.1 0.1 0.2 0.3 0.2 0.3 0.2 0.2 0.2 0.1 0.2
0.2 0.2 0.1 0.2 0.3 0.2 0.2 0.2 0.2 0.0 -0.2 0.1 0.4 0.4 0.3 0.1 0.1 0.0 0.0 0.1 0.2 0.2 0.1 0.0 0.1 0.1 0.3 0.3 0.2 0.0 -0.1 0.1 0.2 0.0 0.2 0.2
0.1 0.3 0.4 0.3 0.5 0.4 0.3 0.2 0.2 0.0 0.1 0.0 0.2 0.4 0.7 0.5 0.4 0.0 0.1 0.0 -0.1 0.1 0.3 0.4 0.4 0.1 0.1 0.2 0.0 -0.1 0.0 0.3 0.1 0.2 0.2 0.2
0.0 0.4 0.3 0.0 0.0 0.2 0.0 0.0 0.0 0.3 0.3 -0.1 0.3 0.8 0.7 0.4 0.6 0.6 0.5 0.4 -0.1 0.1 0.2 0.2 0.1 0.2 0.1 0.1 0.1 0.2 0.3 0.3 0.3 0.4 0.1 0.2
0.1 0.2 0.2 0.0 0.2 0.0 0.1 0.4 0.1 0.2 -0.1 0.0 0.4 0.3 0.4 0.3 0.4 0.3 0.7 0.4 0.1 0.2 0.1 0.1 0.2 0.1 0.3 0.1 0.4 0.1 -0.1 -0.1 -0.2 -0.3 -0.2 -0.1
0.3 0.2 0.0 0.2 0.2 0.1 0.2 0.3 0.3 0.3 0.7 0.4 0.4 0.1 0.2 0.1 -0.1 -0.1 0.2 0.1 0.3 0.1 0.0 0.3 0.3 0.4 0.2 0.5 0.6 0.5 0.6 0.2 0.4 0.1 -0.1 -0.1
-0.1 0.0 0.6 0.1 -0.1 0.1 -0.1 -0.2 -0.5 -0.3 0.4 0.9 0.4 0.0 -0.4 -0.1 -0.1 -0.1 0.2 0.2 0.2 0.1 0.1 0.4 0.5 0.3 0.0 0.4 0.7 0.7 0.6 0.3 0.1 0.2 0.1 -0.1
0.0 0.0 0.5 0.4 -0.4 0.2 0.5 0.1 0.2 0.3 0.4 0.8 0.5 -0.2 0.2 0.2 0.4 0.7 0.3 0.1 -0.1 -0.2 -0.7 0.4 0.3 0.3 0.2 -1.5 -1.4 -0.9 -0.9 -0.4 0.0 -0.6 0.2 0.0
-0.1

500 KM SATEMS : MEAN O-B TEMPERATURE DIFFERENCES (DEG C) : 30 TO 50 HPA
JUNE 1993
FIGURE 28
NOAA-12. USING ALL OBSERVATIONS
VALUES ARE PRINTED WHERE > 30 OBS ARE PRESENT



				1.9	1.9	1.9	2.0	2.0	1.7		1.6	1.8	1.8	1.8	1.6	1.8	2.0	1.7														2.0		1.8	
2.1	2.0	1.9	1.9	1.8	1.9	1.8	1.8	1.8	1.9	2.1	2.2	2.2	2.4	2.2	1.9	2.0	2.1	2.1	2.1	2.1	2.1	1.9	2.0	2.0	2.0	1.9	2.0	1.9	1.9	1.9	1.8	1.6	1.6	1.9	2.0
1.7	1.1	0.7	0.6	1.1	1.3	1.7	1.8	1.9	2.1	2.2	2.2	2.4	2.1	2.0	2.0	1.7	1.7	1.6	1.3	1.5	1.6	1.2	1.2	1.2	1.6	1.7	1.9	1.9	1.7	1.4	1.5	1.5	1.5	1.5	1.7
1.6	1.8	1.8	1.5	1.2	1.3	1.4	1.5	1.7	1.9	1.8	1.8	2.0	1.9	1.7	1.4	1.1	1.0	1.2	1.1	1.3	1.5	1.4	1.4	1.7	1.7	1.6	1.5	1.2	1.4	1.2	1.4	1.8	1.8	1.6	1.6
1.9	1.8	1.6	1.4	1.0	1.3	1.7	1.8	1.9	2.2	1.9	1.8	1.8	2.0	1.8	1.6	1.3	1.8	1.9	1.6	1.5	1.6	1.8	2.2	2.3	2.7	2.5	2.1	1.8	1.8	1.7	1.7	2.0	2.2	2.1	1.8
1.3	1.3	1.0	0.7	0.5	0.9	1.7	1.9	1.7	1.8	1.8	1.5	1.8	1.8	1.9	1.9	1.6	1.6	1.5	1.3	1.4	1.5	1.5	1.7	2.4	2.8	3.1	2.8	2.8	2.1	1.6	1.7	2.3	2.2		1.4
2.2	2.2	2.3	1.9	1.8	1.9	1.9	1.8	1.9	1.7	2.1	2.1	2.3	2.5	2.5	2.5	2.0	1.9	2.2			1.8	2.0	2.1	2.2	2.8	2.8	2.7	3.0	2.5	2.4	2.3	2.4	2.3	2.4	2.4
2.5	2.3	2.5	2.0	1.7	1.8	2.0	1.7	1.7	1.9	1.8	1.8	1.9	2.4	2.2	1.9	1.7	1.6	1.6	1.8	1.5	1.4	1.0	1.2	1.5	1.4	2.0	1.7	1.9	1.8	2.3	2.6	2.1	2.0	2.5	2.9
2.7	2.1	2.1	1.7	1.4	1.6	1.5	1.3	1.5	1.7	1.7	1.4	1.4	1.7	1.9	1.5	1.2	1.6	2.0	1.2	1.2	1.4	1.1	1.0	0.8	1.3	1.6	1.8	2.0	2.3	2.5	2.7	2.6	2.6	2.8	2.5
2.6	2.5	2.3	2.3	2.2	2.1	1.8	1.7	1.4	1.8	1.7	1.8	2.2	2.5	2.0	1.7	1.8	2.6	2.1	2.5	2.2	2.1	1.3	1.1	1.3	1.5	1.6	1.6	2.0	2.5	2.7	2.8	2.9	2.8	2.8	2.6
2.3	2.5	3.2	2.9	2.5	2.2	2.4	2.4	2.1	2.6	2.7	2.8	2.5	3.2	2.6	2.2	2.2	2.3	2.5	3.1	2.9	2.3	2.2	2.2	2.3	2.3	2.5	2.4	2.1	2.1	2.5	2.4	2.6	2.7	2.4	2.2
2.3	3.0	3.9	3.3	2.9	2.5	2.1	2.1	1.8	2.1	2.1	2.7	2.6	2.5	2.1	1.9	2.2	1.8	1.7	1.6	2.1	1.5	2.0	2.4	2.7	3.0	2.8	3.0	2.7	2.5	2.2	2.3	2.8	2.0	2.2	1.9
1.7	2.6	2.8	2.2	1.9	1.9	1.7	1.8	1.6	1.4	1.8	2.0	1.4	1.2	1.4	1.4	1.5	1.2	0.6	0.6	1.6	1.6	1.9	1.8	2.5	2.3	2.3	2.0	2.0	1.9	1.5	1.8	1.2	0.8	1.4	1.4
1.7	2.3	2.0	1.8	1.6	1.4	1.5	1.5	1.3	1.1	1.6	1.8	0.8	0.7	0.7	1.0	0.9	0.8	0.2	0.5	1.0	1.2	1.7	2.1	1.9	2.3	2.2	2.1	2.1	2.0	2.2	1.9	1.4	1.1	0.9	1.2
1.5	1.7	1.4	1.5	1.4	1.3	1.1	1.3	1.2	0.9	1.1	1.3	1.0	0.8	0.9	1.3	1.1	1.2	0.7	1.0	1.2	1.2	1.3	1.3	2.0	2.1	2.1	1.9	1.8	1.4	1.5	1.8	1.5	1.7	1.8	1.6
1.6	1.4	1.0	1.1	1.0	1.1	1.2	1.1	0.8	0.7	0.7	1.9	1.4	1.3	1.4	2.1	1.8	1.5	1.5	1.4	1.4	1.5	2.1	2.5	2.4	2.0	2.2	2.0	1.5	1.5	1.7	1.8	2.1	1.9	2.0	1.6
1.0	1.1	1.7	1.6	1.4	2.2	2.0	2.2	2.2	2.2	2.2	1.9	1.7	1.2	1.2	1.8	1.8	2.3	1.4	2.1	2.4	2.7	2.5	1.6	2.0	2.2	2.1	2.9	3.0	2.7	3.4	2.3	1.9	2.4	1.7	1.0
														1.7																					